

CREATIVE CERAMICS

A PRIMITIVE CRAFT BECOMES A FINE ART

By *Katherine Morris Lester*



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FOREWORD

The general revival of the crafts and the widespread interest and enthusiasm for that ancient but most fascinating of mediums, clay, have been the inspiration leading to the preparation of this book.

Though the book covers a wide range of possibilities in clay as a craft, it is primarily written for those who have not had a broad experience in the clay field, for beginners and amateurs, if you please.

It is the hope of the author that the various possibilities presented for interesting projects, all of which give the creative ability of the worker free range, may serve as a stimulus to original endeavor. Also, that he may find not only a pleasure but a real satisfaction in a material so responsive to his every idea.

The author wishes to express sincere appreciation for the many courtesies and privileges extended while the text was in preparation, very especially to S. W. Rapp, Jr., secretary-treasurer of the Morton Potteries, Morton, Illinois, whose splendid coöperation contributed much to the development of the book. To Nathan Rapp, expert "thrower" at the Morton Potteries, the author is indebted for making possible the photographs on throwing, Chapter Nine. Acknowledgments are also made to The Metropolitan Museum of Art, New York City, The Art Institute of Chicago, and the New Mexico State Tourist Bureau, Santa Fe, New Mexico, for the excellent photographs used as illustration; to Helen Westermann for pen drawings; and to the several individual studios

and craftworkers who have so generously contributed to the illustrations of the text, to each of whom a credit is given with the illustration.

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THE AUTHOR

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Chapter One

CLAY AS A CRAFT MEDIUM

Ever since primitive man discovered that unusual earthy substance with which he could make little images of his pet animals, and fashion crude likenesses of his fellow men, the whole world has been toying with the same idea. Indeed, not only "toying" but long ago brought to perfection the art of fashioning both figures and other objects of great beauty in this same earthy substance which we know as clay. The primitive craft has become a fine art!

It was, no doubt, the highly plastic quality of clay and its sensitive response to the slightest pressure that fascinated the primitives. It is this same plastic quality which, charmlike, continues to hold the interest of moderns.

In today's ceramic market one finds varied, interesting, and beautiful objects created by the sensitive fingers of modern artists. Charming figurines, an age-old idea, have been revived and set in our present-day world. Decorative tiles in modern design are executed in color and used as backgrounds for fountains, for color notes in mantle pieces, and, when set in wrought iron, as handsome and durable table tops. Further, birds, fruits, and flowers are proving an inspiration for design; many of these find a place in wall decoration and also as centerpieces for modern table decoration.

Historic design is still another source of ideas for choice ceramic pieces—book ends, wall brackets, and other objects.

Clay has even invaded the fashion world, being extensively used for the modeling of articles for personal adornment—pins, earrings, and necklaces. In some instances the glazes for these pieces are studied especially with the idea of harmonizing the color and texture with that of beautiful handwoven woolens.

The making of hand-built and wheel-thrown pottery is a ceramic field in itself which, with an appreciation of the importance of form and decoration and the fascinating interest of glaze, offers a wide range of varied and stimulating activities. In fact, so many are the possibilities in this delightful medium of clay as to well appear limitless to the creative worker.

Modeling in clay is a three-dimensional art. It necessitates a grasp of form in three dimensions. In this it is different from drawing which aims to represent the same in one plane only. This is difficult, especially when one has never had experience in the modeling of form. Modeling in any plastic material, whether potter's clay, oil-treated clays, or wax, is the most effective training known for developing the ability to delineate form. Such experience helps one not only "to see" form but also to gain an understanding of construction. It is this knowledge of form which underlies all the arts. This understanding and this appreciation of form comes more easily and more effectively when one shapes things with his own two hands. Clay as a modeling medium has the advantage of requiring the use of both hands at the same time, a training which is of practical value.

In the field of education, the value of clay as a medium of expression has long been recognized. Hence, today, clay work in its various phases is a cherished activity in many of the nation's forward-looking schools. In the commercial field, clay as a craft grows into ever-widening channels for creative effort. With some knowledge of clay technique and design, the adult may find not only a hobby but a craft that may well carry over into the commercial field. Witness the interesting and beauti-

ful ceramic work, outcroppings of native creative ability, which many individuals and studio groups are now presenting the buying public.

One of the most striking facts about the use of clay is that so far as known all peoples of the world have been familiar with its use and possibilities. It is claimed that no nation has been found that has not had a knowledge of clay and from earliest times has not used this knowledge to contribute to the religious and social needs of its communities. Much of the earliest work recovered testifies to its use in the religious life of the people, and the long line of unparalleled ceramics, pottery, and porcelain is permanent evidence of its practical use. Ceramics is said to be the only art of which the modern world has an unbroken series of examples from remote times to the present.

Fortunately, clay as a craft does not call for an elaborate and expensive outlay for tools and material. In this respect alone the possibilities for carrying on the craft are very different from what they were even two short decades ago. Today a variety of clays, carefully prepared by experts, is available and may be purchased in small or large lots from the various pottery-supply dealers. Further, glazes, wheels, kilns, tools, and other useful, though not always necessary, supplies for the beginner may be purchased through these same supply dealers.

GENERAL EQUIPMENT

In the following list, various types of clay are given for general information. The moist modeling clay, or potter's clay, is the type used where the equipment includes a kiln. All others, however, are interesting and worthy of attention.

(A) Clays

(1) **MOIST MODELING CLAY.** At the top of the list moist modeling clay, sometimes called "potter's clay," suitable alike for both modeling and ceramics, is the most satisfactory all-pur-

pose clay. This will dry hard and when fired goes through the biscuit and "glost" firing with satisfactory results.

(2) "SERAMO" CLAY. A new type of clay that can be successfully low-fired in a kitchen oven, and which is especially suited to children's experiments, is now available. This clay can be incised and glazed, the glaze being fitted to the body. The glaze also furnishes a base for any further decoration in oil colors or enamels which one may care to add. A second coating of glaze makes the piece both fire- and waterproof.

(3) SELF-HARDENING CLAY. Today, a clay which is self-hardening or permanent setting is available. This preserves any modeled piece in permanent form without firing. These clays are never glazed but may be fittingly decorated with paint, enamels, or lacquer, and a finishing coat of clear lacquer or varnish added.

A special self-hardening clay, known as "Mexican Pottery Clay," comes in powder form and should be prepared with water to the proper consistency for modeling. When thoroughly dry, it is almost equal in hardness to kiln-fired clay. If decoration is desired, tempera colors or enamels are excellent. The rich, red color of the undecorated surface, as well as when decorated, is often coated with a transparent finish of white shellac, lacquer, or clear varnish. Fig. I.

(4) OIL-TREATED CLAY. This clay is known under various names, and each is an excellent modeling clay. This is the clay used by sculptors and designers in working out their original models before they are produced in permanent form. Oil-treated clays require no preparation, are always ready for use, and remain plastic indefinitely. Moreover, such clays may be used over and over again. They are supplied in various colors and in time dry to about leather-hard, but are always easily manipulated.

(B) Glazes

A second consideration is that of glazes. A glaze is a thin



Fig. 1. Jar, tile, and ash tray in Mexican self-hardening clay. Decorated with incised line and poster colors. Finished with a coating of clear lacquer.

coating similar to glass that protects the surface and makes the ware water-resistant. Not all clay workers are sufficiently informed in chemistry to enable them to prepare their own glazes. Consequently, glazes prepared by experts are furnished in a great variety of colors by the supply dealers. These may be purchased in both transparent and opaque—that is, matt—glaze. The latter is used on some of the most beautiful of modern pottery.

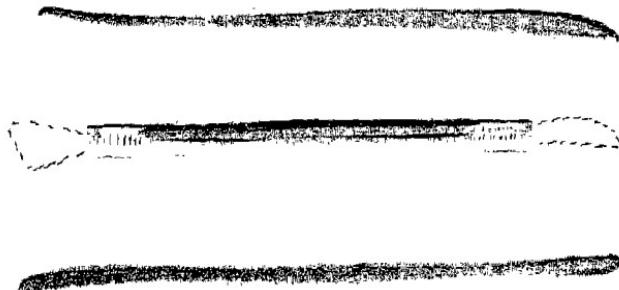


Fig. 2. Modeling tools. Top—shaped like a small thumb. Middle—with wired ends, for removing clay. Bottom—convenient for reaching small places.

(C) The Potter's Wheel

There are several kinds of potter's wheel, both electric and foot-propelled—that is, the "kick wheel." Since, however, a wheel is not a necessity for successful pottery making for a beginner, it is sufficient to state that both electric and kick wheels are supplied by dealers.

(D) The Kiln

The kiln is a necessity unless, perhaps, a commercial pottery is located in the community. Usually, for a small consideration, the commercial potters are willing to fire school and studio ware. However, one will find it far more satisfactory to have his own kiln, if only a small one. Experiments with various clays and glazes, and the resulting knowledge and satisfaction, make the possession of a kiln a necessity to the creative worker.

(E) Tables, Modeling Boards, Tools, Bats

(1) TABLES. A large table is a necessity. A few smaller tables, depending upon the number working, may be used.

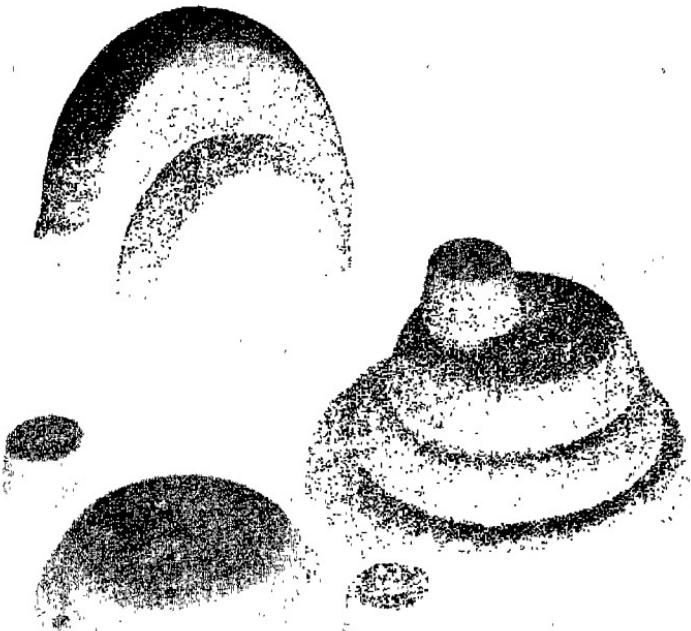


Fig. 3. Plaster bats.

(2) MODELING BOARDS. Drawing or modeling boards that will not warp should be supplied. These should be 12 x 14 or 12 x 18 inches in size.

(3) TOOLS. A few tools are necessary. Those shown in the illustration are sufficient for a beginning. Fig. 2. These are especially shaped, basswood tools and inexpensive.

(4) PLASTER BATS. These are especially useful in building pottery forms and small figures. The piece on a bat can be easily turned and studied with more satisfaction than when

working on a modeling board or table. Are useful in various sizes. Fig. 3.

Directions for making plaster bats¹

Materials

A number of ordinary baking tins, some 2-inch, some 4-inch. Three or four pie pans.

Soap size or vaseline.

Plaster of Paris.

Bucket half filled with water.

Brush soap size or vaseline generously over inside of pans.

Set pans on a perfectly level table. Prepare plaster, fill pans and leave to harden. After twelve to fifteen hours, the pans may be turned face down and tapped on the table. The bats will fall out.

This process may be repeated until a sufficient number of bats have been made.

(F) Containers for Clay

For a large group of workers a plaster- or zinc-lined box is necessary in order to keep the clay in proper condition. When groups are small a large crock is adequate, and even the lowly waste can, kept tightly closed, is very satisfactory. All clay should be covered with damp cloths when left.

(G) Sink With Running Water

(H) Plaster of Paris

Quantity depending upon the purpose for which it is used.

As one proceeds from rather a small beginning, he will, as his interest grows, gradually acquire the habit of collecting other "helps" such as wire, sponges, string, scraps of linoleum, jars, etc. Many of these he will find useful if venturing into the field of mold making.

¹ See directions for preparing plaster, p. 162(4).

Chapter Two

MAKING A BEGINNING

E very individual, be he primitive or modern, child or adult, reacts to the use of plastic clay in much the same way. Give anyone a small batch of clay and the first impulse is to squeeze it, roll it, press it—and then make something. It is this easy handling of clay that so attracts and pleases. It is this same easy handling, or manipulation, of clay that gives it unusual value, especially in the field of education. It is not how perfect a horse, a dog, or a man that Johnny may make that counts, but it is in the *doing*, in the activity itself, that the value lies. This is especially true of beginning work, where each expresses himself on the level of his own development. Children find great joy in shaping various figures, no matter how crude. They instinctively make heads, legs, arms, tails, etc., and “stick” them onto the body. These, of course, drop off. Adults, as beginners, do the same. This activity, however, is educational, for it soon develops a real need for direction. Then it is that a fundamental principle of the modeling art will be better understood—namely, that a figure is built up gradually, little by little, by making each bit of added clay a compact part of the batch of clay with which one begins. Instead of making legs, arms, tails, etc., separately, and “sticking” them onto the body, the added clay must first be wedged into the clay mass, and then modeled into shape. In this way, the beginner gains a better understanding of the form as a unit, rather than that of a body with the



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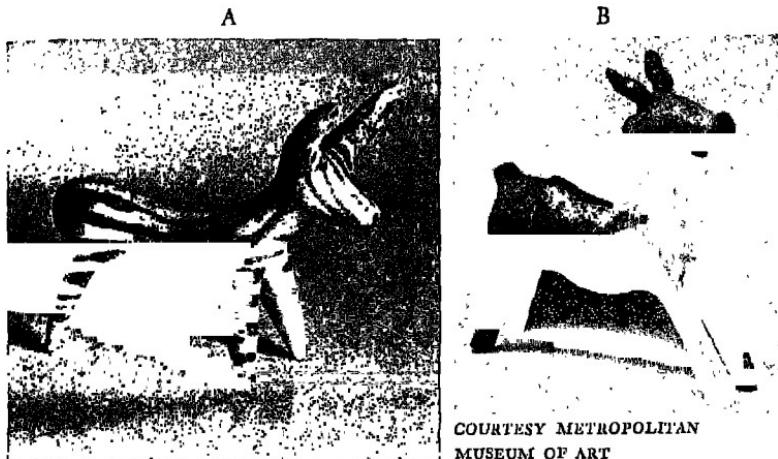
Fig. 4. Hippopotamus, terra cotta covered with a turquoise glaze. Egyptian, Twelfth Dynasty. Found in an ancient tomb.

parts added. With this type of instruction, one is receiving foundation training in real modeling. He, also, of necessity, is using both hands in the effort.

Looking back to the childhood of the race, we find that primitive peoples of that distant day early discovered the fascinating quality of plastic clay and that each group in its own way expressed its own ideas on the level of its own development. One of the earliest examples is the famous "blue" hippopotamus from Egypt, dating from the Twelfth Dynasty (2000-1788 B.C.) Fig. 4. Modeled in clay, baked, and covered with a turquoise glaze, it is one of the choice pieces of antiquity. Such a finished piece is known as faïence.¹

The early artist not only modeled the form but also carried out his own idea in the unusual decoration. He has drawn in black the blossom and buds of the sacred Egyptian lotus. This decoration, to the primitive artist, probably suggested the ani-

¹ Faience: Baked clay which has been covered with an opaque glaze to hide the body of the ware.



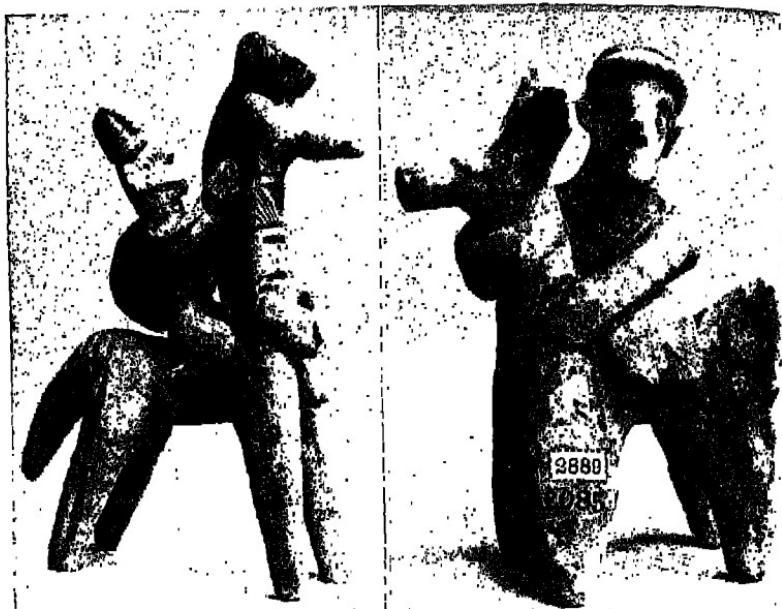
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Fig. 5. Animal forms from Mycenae. Terra cotta. 1400–1100 B.C. A. A bovine animal. Height 3½ inches. B. Goat, covered with gold leaf.

man's native habitat, the Nile, or possibly he may have chosen to represent the shadows falling upon the bulky body. Note, too, the surprising skill with which the artist adapted his decoration to the size and shape of the surface, the blossom of the lotus fitting the top of the head, and the buds with long stems properly adapted to the sides. The figure is about 8 inches in length and is one of the treasures of the Metropolitan Museum of Art, New York City.

From ancient Mycenae, in Greece, come the animal figures, Fig. 5. These date somewhere between 1400 and 1100 B.C. Both figures are so simplified that they appear almost modern. The artist's concept, however, is expressed in clay and this material itself had much to do with the result. It is baked clay, terra cotta,³ and no supports could be used to hold the clay in place for these would have been destroyed and the piece broken during the firing. Therefore the early worker formed the legs as supports, with no effort toward realistic modeling, and kept the body light enough to prevent sagging. In one, he spread the front legs just enough to give support to the broad

³ Terra cotta: Clay which has been baked.



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Fig. 6. Riders from Cyprus. Terra cotta. A warrior and a bearded man riding sideways.

chest, the neck, and head. Then, to complete his idea, he added the decoration, stripes of a dark color which fall in with the contour of the figure. Many of the earliest examples show a similar decoration of stripes emphasizing the line of the figure.

The terra-cotta figure of the goat shows a similar effort on the part of the artist to make the legs carry the weight of the body and head. Instead of the striped decoration, this figure was entirely covered with gilding, which is unusual.

The riders from Cyprus show similar qualities in the modeling, having pillarlike legs to support the weight. Fig. 6. The team of horses from the early Iron Age (Cyprus) is a charming example of the primitive concept of a team. Fig. 7. Note the decoration and how the artist emphasized the long neck by running the decorative line from the broad chest up, and then

followed the curve of the neck with the short, rounded lines, well spaced.

Today, we look back upon these works of the ancient artisans in clay and marvel at the naïve charm of the figures and the "feeling" expressed in line and pattern. Beginners in our modern world often surprise their elders with their untutored creations—that is, with their original ideas expressed on the level of their own development. These, too, are not to be discouraged, for they often carry a childlike charm, had the elders only an eye to see.

There comes a time, however, when the earnest student would go on to new and untried fields. Then it is that the art of modeling and other phases of the clay craft may be directed toward more definite progress. The object now is to develop a keener observation, a more accurate rendering of form and character, and some understanding of design quality. It is at this period that a real appreciation of clay technique, and clay as a medium of expression, may be developed.

The properties of any material govern the manipulation of that material; out of this necessary handling of a material grows technique or why one works in one way rather than another. Working in the right way adds much joy to the process, and usually insures a more expressive result. Hence, the importance of beginning with a real appreciation of one's material and the handling or technique best adapted to that material.



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Fig. 7. A team of horses. Terra
cotta. Cypriote. Early
Iron Age.

Being one of the most plastic of materials, clay can be controlled better by the fingers than by means of tools. In fact, the most useful of all tools is that supplied by nature, the thumb. It is important to realize from the outset that clay is not to be scraped with tools, such as knives, files, etc., sandpapered, or pulled about by the fingers to force it to conform to pattern. As one gains in experience in modeling, each touch should be definite and meant to express a desired quality.

Modeling in clay is strictly a building-up process, piece being added to piece. In this respect it is the opposite of sculpture, which is a chipping away of material. The correct handling of clay as a building-up process may be demonstrated in a very direct and exceedingly interesting way by modeling simple designs which may be completed within a reasonable length of time. Such patterns as those suggested by the various Indian symbols, Fig. 8, also letters, monograms, and the making of a tile, may be used in preparation for more advanced work. Fig. 9.

The Indian symbols are particularly interesting not only because of Indian tradition but also because of the "meanings" attached to them. Though Indian symbols are usually seen in line drawings (a picture language) many of these may be adapted to clay. They suggest in this medium many interesting projects for the craft. For example, in Fig. 8, "End of Day," and "Clouds" suggest book ends; a and d suggest paperweights, and h and j suggest ideas for modern costume jewelry.

DEVELOPING SIMPLE DESIGNS

After choosing a monogram, letter, or Indian symbol, first draw it full size upon a medium heavy drawing paper. Full size is understood to mean the same size as the finished piece. The outline of the drawing should be well defined and, if necessary, it is advisable to go over the drawing with a heavy pencil, making the line clear cut. Then, using the drawing as a basis, the form may be built upon this.

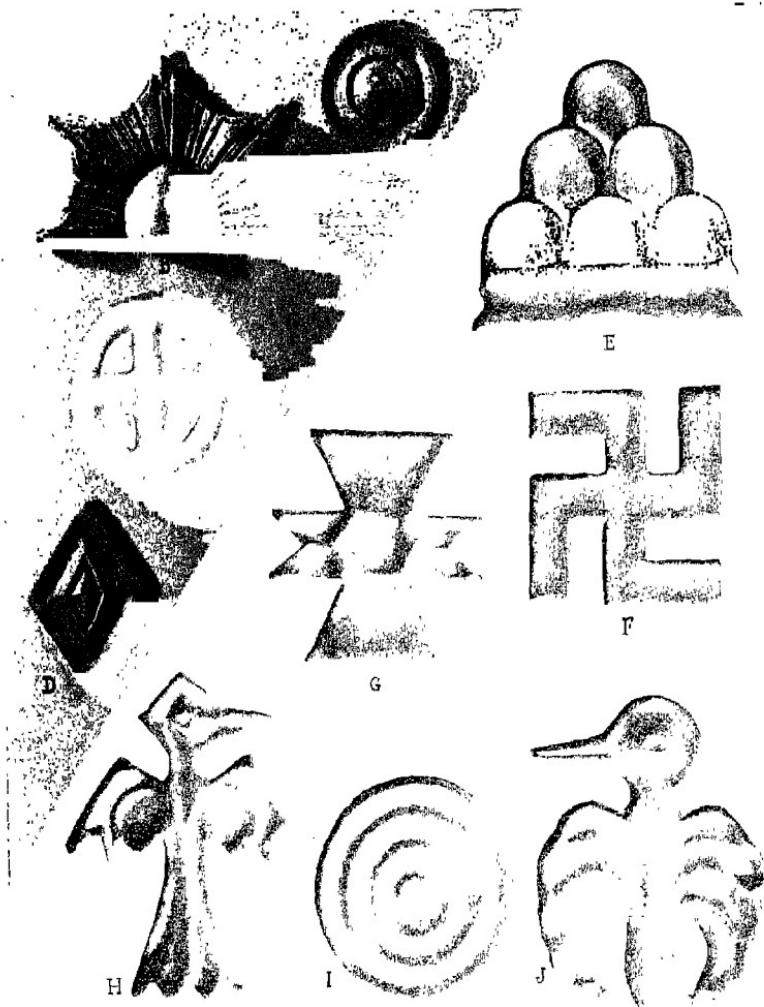


Fig. 8. Indian symbols. Upper left, oil-treated clay. Right, potter's clay.
 A. Buffalo's eye. B. Sunset. C. Day. D. Medicine man's eye.
 E. Clouds. F. Swastika. G. Four winds. H. Thunder bird.
 I. The Sun. J. Thunder bird.

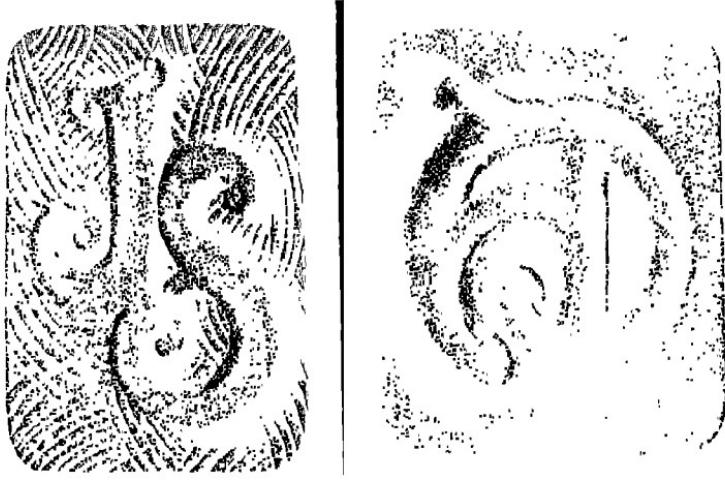


Fig. 9

Before beginning with the clay, one should supply himself with a moist cloth. This should be spread over the batch of clay from which one works in order to prevent drying. It is also useful in keeping the fingers moist. A small pan of water at hand may be of some advantage.

With the drawing completed and in place upon the modeling board, a length of clay is then rolled out to about $\frac{1}{2}$ inch in thickness and the pencil drawing is outlined with this. Fig. 10. The clay is pressed down well onto the paper on the inside, to hold it, using fingers and thumb only. The inner space is then built up piece by piece, the bits of clay being well wedged together. Fig. 11. The term "wedge" is one generally used in the practice of clay work. All clay when first being prepared for use goes through the wedging process—that is, it is kneaded, pounded, slapped, cut over a wire, and worked considerably. This is to rid the clay of air bubbles and make it more thoroughly plastic. When building with bits of clay, the term wedge is also commonly used and means to work each added piece firmly into the mass. If this is not done, especially

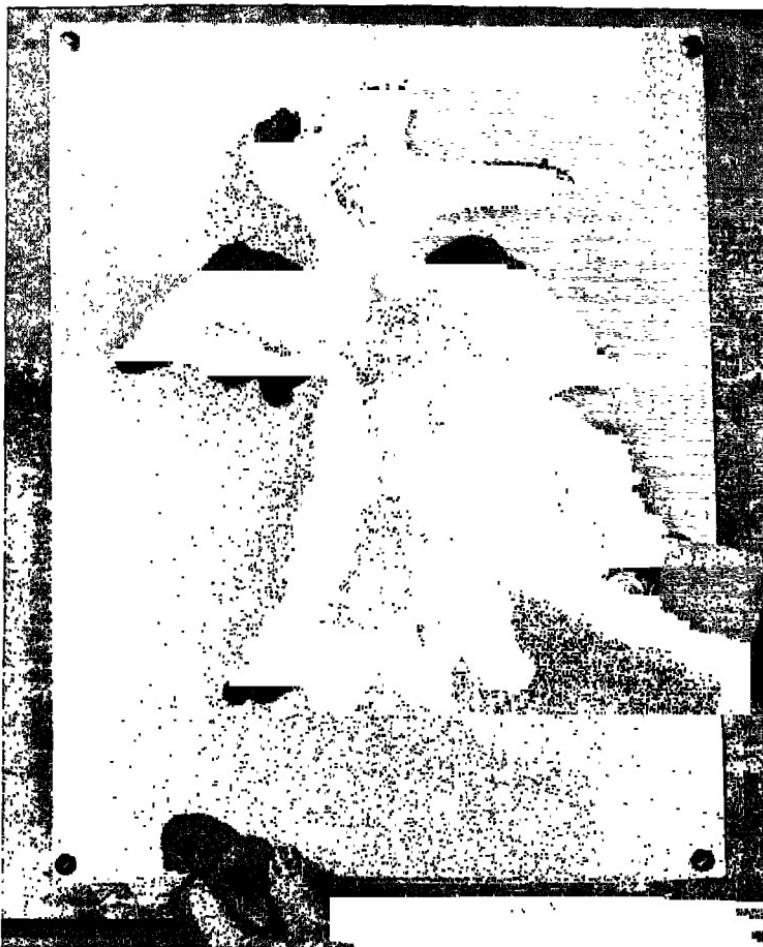


Fig. 10. Outlining the figure.

with pieces to be fired, the escape of air bubbles causes the piece to break in the firing process.

In proceeding with the modeling, attention should be given to keeping the outline correct and not permitting it to become distorted by the subsequent adding of clay. When the simple form has reached approximately $\frac{1}{2}$ inch in thickness,

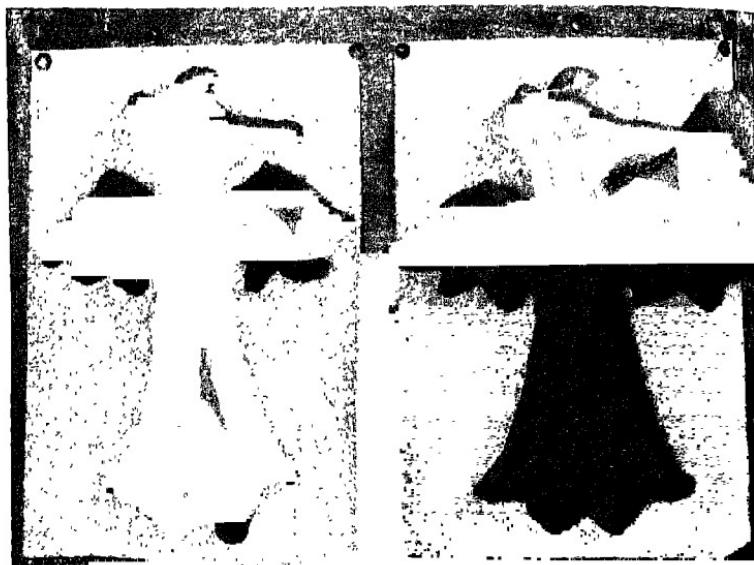


Fig. 11

Fig. 12

Fig. 11. The outline, almost filled with clay. Fig. 12. Completing the figure.

the next step is the smoothing of the surface. The various types of simple depressions running throughout the different forms, Fig. 8, give practice in controlling the movement of the thumb. In such simple designs as the "Buffalo's Eye," "Four Winds," the "Sun," and similar forms, the depressed line is very simple and merely aims to give a pleasing variety to an otherwise plain surface. The moistened thumb is placed on the surface and drawn steadily and with a certain amount of pressure (depending upon the depth desired) around and throughout the form. In such designs as the "Thunder Bird," "Clouds," and "End of Day," the craftworker may plan the form best suited to the pattern. In forming this depression,

some clay is naturally displaced and forms a ridge. This displaced clay is finally smoothed back and into the form, leaving the edge rounded. Fig. 12.

The use of the thumb in modeling becomes a natural procedure after a few such exercises. Moreover, this manner of building and this use of the natural tool, the thumb, cannot be too strongly emphasized at the outset of all work in clay. This makes for definite progress in the manipulation of clay and for growing skill in the rendering of form.

BUILDING A TILE

In the building of a tile the same procedure is followed. The building may be done on medium heavy paper over the drawing outline, or, since the form is usually a simple square or oblong with definite dimensions, the work may be measured for accuracy and the clay built up without the drawing. A circular tile, however, should be built upon the paper pattern with a well-defined edge.

Lengths of clay, about $\frac{1}{2}$ inch in thickness, are rolled out and used to form the outside edge of the tile. The inside space is then filled in with small bits of clay well worked or wedged together. Much of the lasting quality of the tile depends upon the skill with which the clay is wedged together.

After the tile has been built to the desired thickness, it must be well smoothed, turned over, and if any loosely wedged places appear on the under surface (which is very likely) they must be filled in and the clay well worked together. When the tile is completed, it is then ready for the form to be built upon it. This may be a monogram, nature forms—such as seed pods, fruits, or vegetables—or larger and coarser studies. Further, it may be a design—incised, inlaid, in relief, painted in colored clays, or in underglaze or overglaze colors.⁸

As one gains skill in the use of clay, tiles may be made more rapidly by using a frame such as described in Chapter Six, p.

⁸ See Chapter Six for various types of decoration.

82, also in Chapter Twelve, *Press Molds*, p. 187, Fig. 130. For beginners, however, the making of a tile as here suggested leads to a better understanding and appreciation of the process.

Bibliography

- Ellis, Clifford and Rosemary, *Modeling for Amateurs*: The Studio Publications, Inc., 381 Fourth Avenue, New York, New York, 1939.
- Leeming, Joseph, *Fun With Clay*: J. B. Lippincott Company, Philadelphia and New York, 1944.
- Petri, Marie, *Modelling*: The Manual Arts Press, Monroe and Fayette Streets, Peoria, Illinois, 1939.
- Shanklin, Margaret Eberhardt, *Use of Native Craft Materials*: The Manual Arts Press, Monroe and Fayette Streets, Peoria, Illinois, 1947.
- Wilson, Della F., *Clay Modeling and Pottery*: The Manual Arts Press, Monroe and Fayette Streets, Peoria, Illinois, 1935.

Chapter Three

MODELING FROM NATURE FORMS

Looking back through the great periods of artistic development, one finds that in each instance Nature with her varied and interesting forms has been the inspiration of the artist. In these great periods, the beauty of flowers and foliage has always made a direct appeal to the eye that could see and the hand that could execute. This is worthy of consideration, for, in contrast, it is interesting to observe that primitive and savage peoples scarcely notice this beauty of line and form in plant life.

For centuries China and Japan have led the world in the beautiful decorative treatment of plants, vines, and native shrubs. The chrysanthemum, cherry blossoms, and innumerable small trees and shrubs appear over and over again in their lacquer work, ceramics, and textiles. The ancient Egyptian found in the blue and white lotus, the palm, and the papyrus, countless ideas for conventionalized pattern. Many of these he spread in color upon the broad walls of his temples; others were the inspiration for the shafts and capitals of the massive columns. The Greeks transformed the lotus and palmette of the Egyptians into the anthemion, which singly and in borders and bands decorated their pottery and, with the acanthus leaf and vines, served as carved ornamental detail for temples and



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Fig. 13. Fragment of carved frieze showing plant motif. Coptic.
Sixth century, A.D.

public buildings. The Romans adopted many of the Greek forms, greatly varied them, and developed many new plant motifs such as wreaths and festoons of flowers, leaves, and vegetable forms.

It was, however, the carvers of the late Gothic period (twelfth and thirteenth centuries) who first made a principle of going to plant life as a source for design, especially design for carved ornament. Consequently, we see the capitals, moldings, crockets, finials, and crestings of the late Middle Ages budding forth in a marvelous variety of floral forms and beautifully turned foliage. Fig. 14.

This feeling for the application of plant forms as a decorative motif has reached its highest development in the modern world. In America, Nature provides an unlimited store of interesting subjects for design, which may be approached through the modeling of these various forms. Large seed pods, large leaves, buds, many of our native wild flowers, fruits and their foliage, and vegetable forms are excellent material for the clay enthusiast. Fig. 15. Further, these specimens are in great variety, are easily accessible, and afford needed practice for the beginner.

Many of these nature forms may be developed on tiles of various and pleasing shapes—oblong, circular, oval—and used



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Fig. 14. Capitals showing plant motif. French. Romanesque period.

as effective wall plaques. If one is equipped to handle glazes, these may emerge as works of art. Often the wall plaques are cast in plaster. The plaster cast may then be given an appropriate finish.¹ Such flower forms as "Jack-in-the-pulpit," Fig. 16, the calla lily, the tulip, and others may suggest to the creative worker many possibilities in design for attractive wall pockets used for growing plants and vines; for candle holders, ash trays, bon-bon dishes, and others equally attractive. Fig. 17.

All nature forms should be studied as such, and not from prepared conventional forms. Any conventional form is merely someone's interpretation, while the fact is the natural plant. Therefore study the natural plant first, the fact, and through this proceed to the design form. The appreciation of both

¹ See Chapter Twelve, *Mold Making and Casting*; also Chapter Thirteen, *A Finish for the Plaster Cast*.



Fig. 15. Modern studies from nature forms.

decorative design and conventionalized pattern begins with the direct studies from Nature, herself.

The early studies in the modeling of plant forms enable the beginner to receive his first conscious knowledge of "seeing form" and at the same time to register his seeing objectively. Furthermore, though only the form may be emphasized at first, very soon a new and important element enters, that of light and shade, which always imparts life and vitality to the modeled forms. Through these studies, the student becomes better and better acquainted with the form and is far more able to make a satisfactory drawing of the same object. In fact, in developing a more thorough knowledge and appreciation of form, modeling in clay and drawing in pencil make an excellent team, and should proceed at the same time.

Modeled studies of plant forms are usually developed upon a tile or slab, which is made first and represents the table or drawing board upon which the model rests. The form is then in relief. Fruits and vegetables, not so fragile, may be modeled either upon a tile or "in the round"—that is, in three-dimensional form, showing length, width, and thickness.

In making a selection for the first studies, the aim should be to secure the large, simple, and more durable forms, such as the various seed pods, or large and coarser forms of leaf, flower,

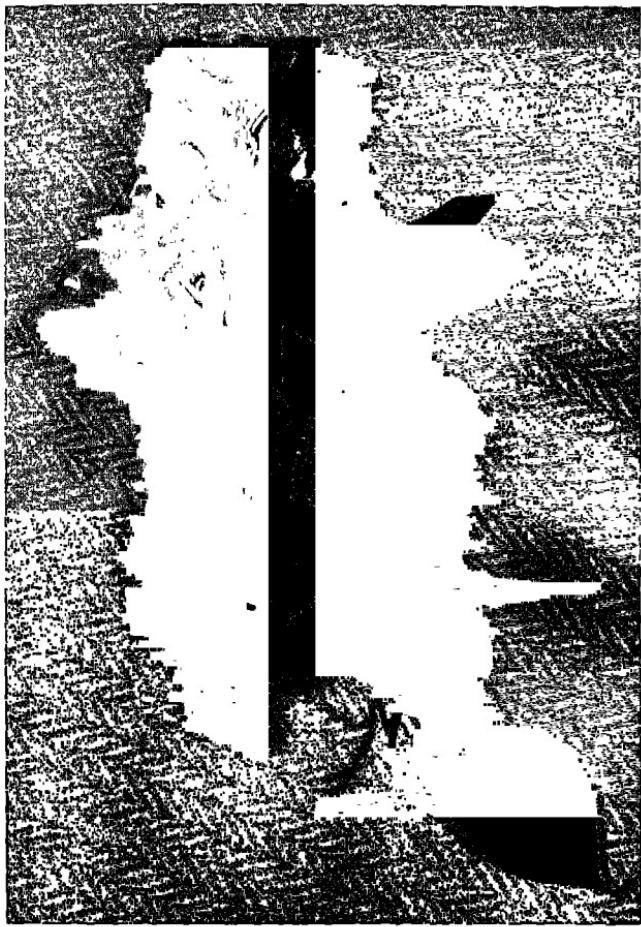


Fig. 16. Wall pocket for vines, developed from plant motif, Jack-in-the-Pulpit.
Pocket, medium green gloss glaze. Jack, lighter green
gloss glaze; red hat.

and bud. Fig. 18. If the model is firm, as in the case of seed pods, fruits, and vegetables, feeling the surface is much more helpful than merely looking at it. In fact, by touch the slightest inequalities of surface may be easily detected. In the study of flower and leaf forms, the large and coarse specimens are far better than the smaller and finer, which easily become limp

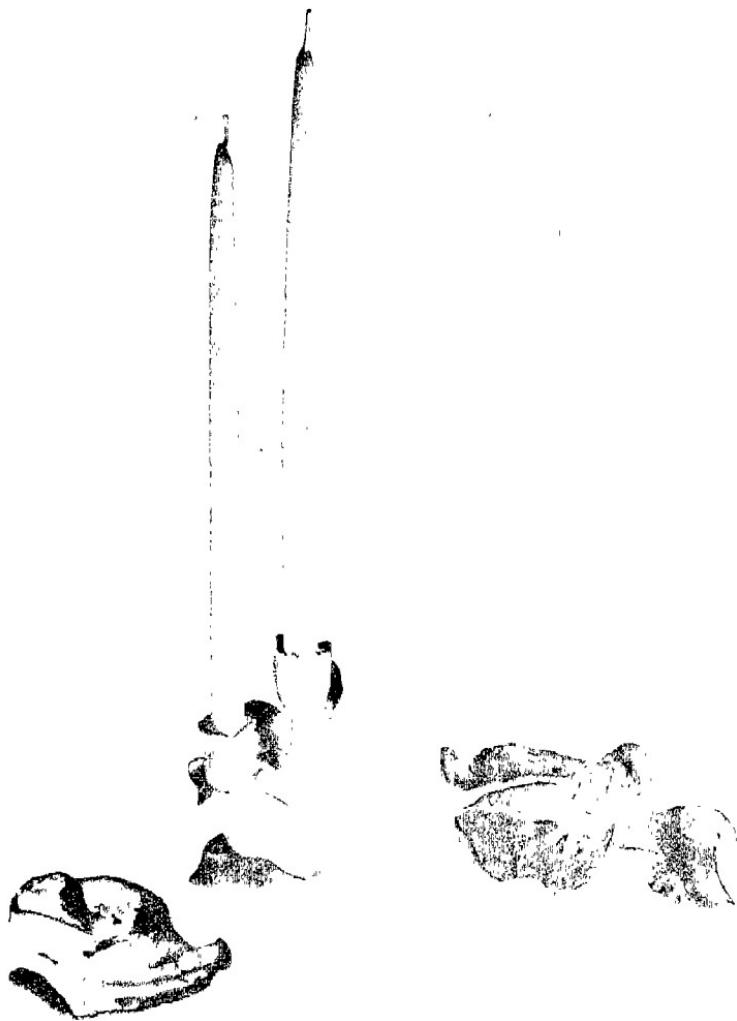


Fig. 17. Modern ceramic pieces developed from plant motifs. Candle holder (one of a pair). Bon-bon dish. Ash tray.

and ragged with handling. The work in hand should be constantly compared to the original. Judging and correcting is a part of the developing process.



Fig. 18. Modern studies in nature forms.

MODELING A SIMPLE LEAF FORM

First, after a selection for study has been made, it is suggested that the model be placed in a pleasing position on a sheet of drawing paper, or any paper light in color. The arrangement is important, and careful thought should be given to the placing. If possible, arrange the study so that the light comes from the side. The undulations of the surface may also be noted, and these may be not only expressed in the modeling but may be exaggerated. The play of light and shade over the undulating surface of a study adds great interest and charm to the modeled form.

After placing the model in position on the drawing paper and preparing the tile, the general outline of the study may be sketched with a pencil or tool upon the smoothed clay surface of the tile. Next, a length of clay is rolled out to the thickness of about $\frac{1}{2}$ inch, and with this the form is outlined. Following this, the inner space is filled in with small pieces of clay, building up from the highest to the lowest parts of the form. This means close observation and careful modeling, working back and forth many times until the work reaches a satisfactory degree of finish. It may then be smoothed by the dampened fin-

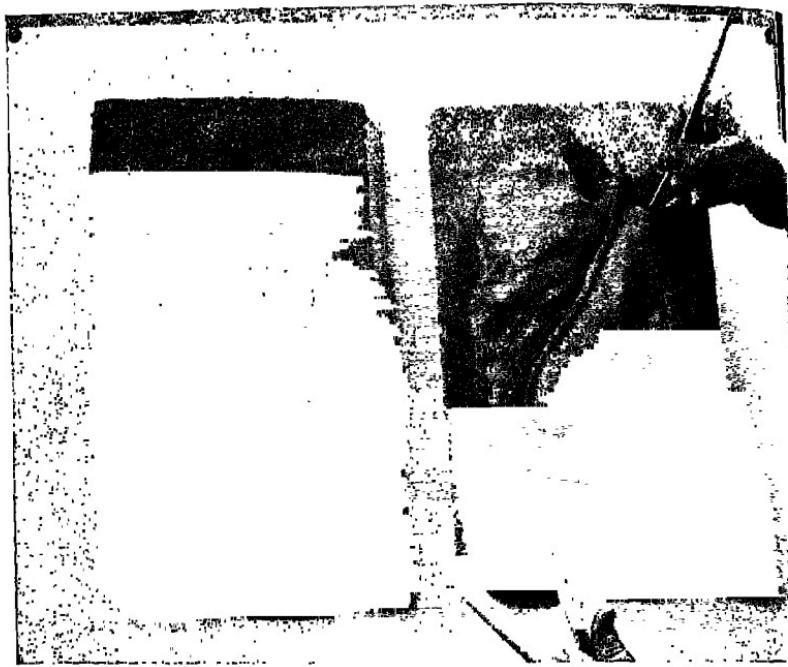


Fig. 19. Modeling a simple leaf form on a tile. At left, the outline has been filled in and the higher areas indicated. Right, undercutting and completing the form.

gertips, the midrib may be indicated, and, possibly, slight veinings suggested.

After the modeling of the form has been completed, one may add to the effectiveness of his work by undercutting. Just where to undercut may be suggested by the position of the study, or one may give one's own interpretation to the form. This is done by running the tool under the edge of the form, pressing lightly upon the tile and perhaps lifting parts of the edge to secure certain pleasing effects. Any undesired roughness caused to either the model or tile may be smoothed again with moistened fingers. The leaf form, Fig. 19, has been modeled to show the undulations of the surface, giving light and shade; and parts are also undercut and lifted.



COURTESY, W. A. CURRIE, LOS ANGELES, CALIF.

Fig. 20. Modern ceramic centerpiece. (Gardenia as motif.)

In modeling from such nature forms, no particular effort should be made to make the edges of the clay model as thin as those of the study. In the last analysis, remember that this final work may be an interpretation of the leaf form and not a slavish copy.

In all modeling of nature forms upon a tile, the same procedure may be followed—namely, the outline first secured, the space filled in, and sufficient clay added to give the desired relief, then modeling from the highest to the lowest parts. Follow with the necessary undercutting, if desirable, and give one's own interpretation to the final study.

In certain studies of fruits, such as grouped bananas, bunches of grapes, and similar forms, the tendency, especially with children, is to set about making each separate banana or each separate grape, and then pile them up in their respective positions. Of course this is not modeling and should be dis-



Fig. 21. Conventionalized patterns developed from plant forms.

couraged. Always, at the beginning, treat such subjects as a mass—that is, the clay mass is given the general shape of the model. Then, beginning at the highest point, the modeling is carried to the lowest. This means working back and forth many times. As the form grows, more and more attention is given to the shapes and these so developed in modeling that finally the complete form emerges. Fig. 19.

Design—that is, the decorative or conventional treatment of nature forms—is the logical step after acquaintance with the natural form. Consequently, after sufficient practice in modeling from nature studies, one may undertake the development of pattern or design from any of the forms studied. This not only brings creative ability into play but is excellent training in design. Fig. 21. Furthermore, it is the design element in all craft work which gives value to the product.

Chapter Four

HISTORIC DESIGN AS SOURCE MATERIAL

The field of historic design furnishes excellent material for creative ideas in clay. At the same time such an interest may develop an appreciation for the great art of the past to which we of today have fallen heir. In the field of architectural ornament, in particular, the forms are especially adapted to plastic material.

Though the term "historic design" includes the general arts of painting, carving, portraiture in wood, stone, and marble, and the building arts as well, it is the architectural ornament, which is a fundamental detail of the great building arts, that is particularly related to the modeling art. Historic architectural ornament refers chiefly to the carved ornament, such as capitals, bands, borders, rosettes, symbolic forms, and unit designs. Architectural designs, such as gateways, triumphal arches, and towers, are also suggestive material.

It is to these reliable historic sources that the modern craft worker may turn for new ideas—original ideas. Such ideas, drawn from the historic but recreated by the craft worker, may be carried into permanent form, and these forms adapted to everyday uses.

The historical significance of such a modern adaptation adds an intrinsic value to the product. For instance, the Egyp-

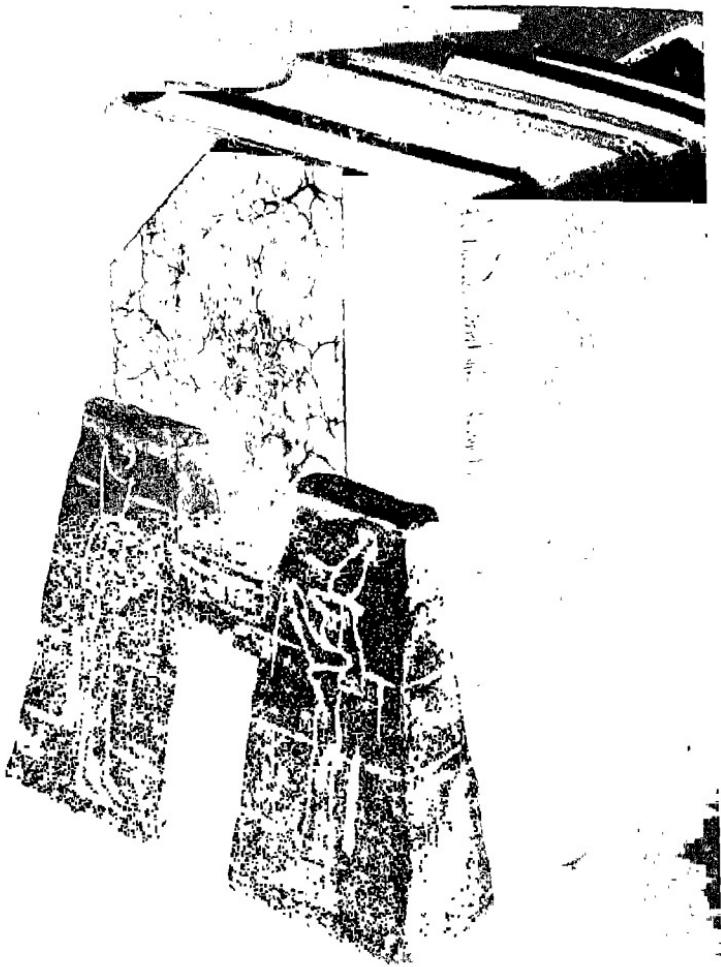


Fig. 22. Egyptian pylon adapted to book end. Modeled in self-hardening clay. Ivory finish with "antique" effect.

tian scarab, Fig. 25, adapted to the modern use of a paper-weight is far more interesting because of its "meanings" than "just another paperweight" would be. The same may be said of the Egyptian pylon, or gateway, Fig. 22, which has been

adapted to clay in the form of a modern book end. Though greatly simplified, the general form remains. The book end, Fig. 31, inspired by Gothic ornament, is still another adaptation. So it is with many of these historic forms. They await only the interpretative ideas of the creative worker.

The six most important historic periods are the Egyptian, Greek, and Roman of the ancient world and the Byzantine, Saracenic, and Gothic (328–1500 A.D.). Though all periods offer interesting and beautiful ornament for study, the illustrations shown were chosen from the three great periods which made widely different contributions to the building arts—namely, Egyptian, Greek, and Gothic. A few of the important forms are illustrated in the modeled examples, and the following brief text is only to remind one of the meanings and interest associated with historic forms in general.

The field, however, is so rich and varied that only by consulting books by eminent scholars and illustrated plates of the various periods will students gain an appreciative understanding of the great contribution made to our world of today. Recommended books with fully illustrated plates are listed at the close of the chapter.

EGYPTIAN

From the land of ancient Egypt comes the beautiful lotus or lily, venerated by the Egyptians as a symbol of immortality and dedicated to the great sun god and the god of the Nile. The annual overflow of the life-giving waters of the Nile kept the lotus forever blooming. Thus it was that the beautiful lily became symbolic of the river as a giver of life, and of the gods, who directed the river's flow.

The lotus was the largest and most beautiful flower growing in Egypt, and much was made of it in both religious and royal ceremonies. It was from this sacred flower that the ancient Egyptian drew his inspiration for a large part of his artistic achievement in both decorative painting and ornament.

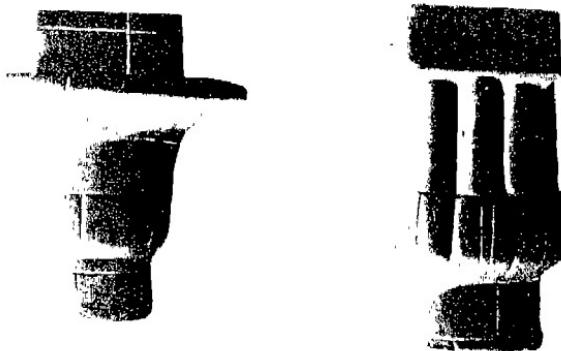


Fig. 23. Egyptian, lotus capitals—the full blown flower and the "bud."

Other plants, such as the papyrus and palm, were also incentives to creative expression, but the general appeal of the large and beautiful lotus is everywhere in evidence. It is seen in the elaborately painted decorations, in capitals, borders, and rosettes. Fig. 23 shows the conventional form of the full-blown lotus, the form so frequently employed as the capital of the great supporting columns of her temples. Also in Fig. 23 is a second type of capital known as the "bud" capital, evidently suggested by the closed form. There are variations of these two types of capital and a few others of widely different character, yet the full-blown lotus and the bud capital are the two basic Egyptian forms.

The same venerated lily is seen in the ancient Egyptian rosettes which, unquestionably, are among the oldest known and, interesting to relate, all later designers have adopted this idea of arranging forms around a center. Fig. 24.

Another historic form symbolizing immortality to the people of this land was the sacred beetle. This was rarely used as ornament; but, carved in soft stone, it was one of the most common of amulets, or charms, worn as a protection against evil. In carving the beetle, the spreading wings and legs were

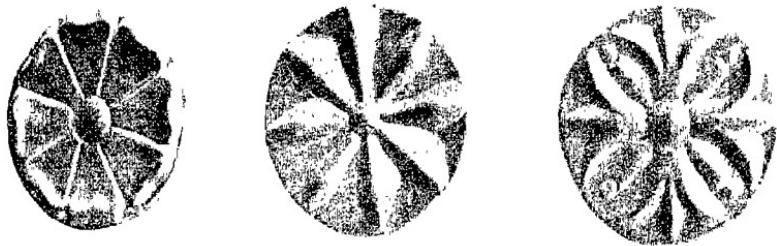


Fig. 24. Rosettes. Egyptian, lotus motif. Probably the oldest rosette forms on record.

brought close to the body, so there were no extending parts, thus making a compact figure and one well adapted to stone or steatite (soapstone). Such a form of the beetle is known as a scarab. Fig. 25. The underside, which was flat, was incised with scroll and spiral patterns and hieroglyphics. These markings, of course, varied with the owner. Some indicated the owner of the piece in which they appeared, others the reigning monarch. The ring settings were sometimes fixed, but usually they revolved upon pins or a gold wire which passed through them. Such a setting could be easily turned and consequently was used often as an official seal.

Because of its compact form, the Egyptian scarab is well adapted to projects in clay. In one of the author's classes it was developed in self-hardening clay as a paperweight. Fig. 25 shows a scarab that has been modeled in self-hardening clay and coated with the color usually seen in ancient scarabs, a soft green. It could also be developed in modeling clay, a mold made, and then cast in some of the newer casting materials recently placed on the market.

Every present-day American visitor in Egypt finds a certain delight in returning with a collection of scarabs. Those sold on the streets of Cairo, however, are planned especially for the tourist trade. The more valuable examples, recovered from the ancient tombs where they have lain for centuries, usually find a place in museum collections.



Fig. 25. Scarab. Modeled in self-hardening clay.

The ancient pylon, the gateway to Egyptian temples, is still another form which, because of its simplicity and compactness, is admirably adapted to clay design. Fig. 22 shows the Egyptian pylon adapted to modern use as a book end. This has been modeled in self-hardening clay, thus avoiding the firing process, and finished in antiqued ivory. On festive occasions the cups shown on the wall, at either side of the entrance, carried the colorful banners and standards of Egypt.

GREEK

All that was best in Greek architecture was embodied in her temples consecrated to the gods. The three famous orders of architecture used by the Greeks—namely, the Doric, Ionic, and Corinthian—were each distinguished by its type of capital. The earliest, the Doric, Fig. 26, shows the column without a base and the capital undecorated. It was probably derived from an earlier one in wood. Vitruvius, the ancient Roman architect, says that this early column was probably inspired by the figure of a man. The average man was found to be six times the length of his foot, and the plain Doric column was made



Fig. 26. Capitals, Greek. Left, Doric; right, Ionic.

six diameters in height. The flutes in the column may have been suggested by the Greek dress.

The second order, the Ionic, is lighter and more graceful, being eight and one-half to nine diameters in height. Its capital, instead of being without decoration as in the Doric, is distinguished by spiral scrolls or volutes at each side, with rich moldings between the volutes. Fig. 26. This ornamentation varies in the capitals, some being fitted with several moldings. The illustration here is a greatly simplified rendering of the Ionic capital, emphasizing the form only, with a suggestion of carving between the scrolls. The same Vitruvius holds that this order was suggested by the graceful figure of a woman, and that the two scrolls were inspired by the arrangement of the hair, and the rich molding by the necklace. The most perfect examples of the Ionic capital are to be seen in the Erechtheum and the Temple of the Wingless Victory, both on the Acropolis in Athens.

The Corinthian order was distinguished by a very ornate capital of acanthus leaves. Today only one perfect example exists. This is in the choragic monument of Lysicrates in Athens. The style was not used extensively by the Greeks, but later the Romans, who loved the rich and ornate in ornament, adopted and used it extensively in their monuments.

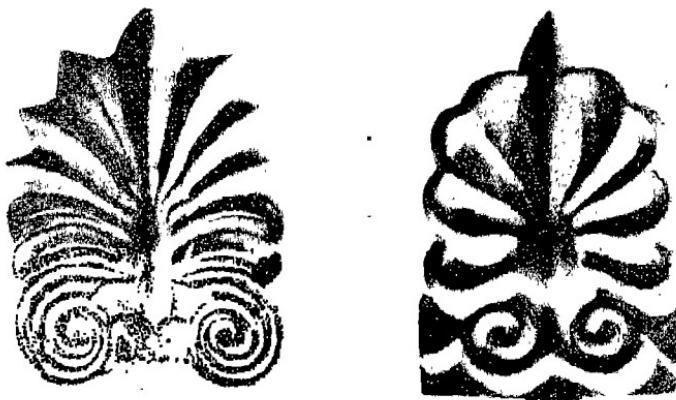


Fig. 27. Greek ornament. The anthemion in design. Left, after an ornament used to surmount a fifth-century tombstone, or stele. Right, a familiar type of anthemion ornament.



Fig. 28. Greek border, "egg and dart."

Second only to the Greek capitals are the well-known nature forms, the anthemion, acanthus leaf, and numerous vines. The anthemion is often called the "honeysuckle ornament." It, however, is believed to have been borrowed direct from the Egyptian lotus and transformed by the Greeks into a great number of anthemion motifs, which were both carved and painted, decorating furniture, pottery, and both private and public buildings. Fig. 27 shows two of the many forms given the anthemion.

It is said that the Greeks were the first to develop the idea of moldings in architecture. The carved anthemion was used with fine effect in both decorative bands and borders. The "egg-and-dart" molding is another well-known Greek border. Fig. 28. This was probably borrowed from an earlier form, but it is always attributed to the Greeks and should be familiar to most Americans, for it is frequently seen in modern American buildings.

GOTHIC

Gothic ornament is famous for the "meanings" always associated with the carved details seen in the churches and cathedrals of the Middle Ages. In that day there were few books, and fewer, indeed, were the people who could read. Consequently, it became the duty of the Church to teach not through the printed page but through the eye. As early as 600 A.D., St. Gregory wrote, "What writing is for those who can read, painting is for the uneducated, who can only look."

The religious leaders made it the duty of the Church to teach the ideals of the Christian faith by constantly placing before the people these same ideas in symbolic form, which the people looked upon and understood. Paintings and frescoes in the churches filled the same purpose. In this way the Bible was made familiar through picture and symbol.

The ornament of the Gothic period was largely a symbolic language used to teach the mysteries of religion. So it is that the cross, window traceries, trefoils, quatrefoils, the pointed arches, and the upward soaring columns can never be separated from their religious significance. These ornamental details were regarded as a means of lifting the thoughts of the people above things of earth to heights more spiritual.

Some understanding of the meaning of these forms helps one not only to appreciate the beauty of these details but also to understand how completely the Gothic church was invested with symbolic meaning.

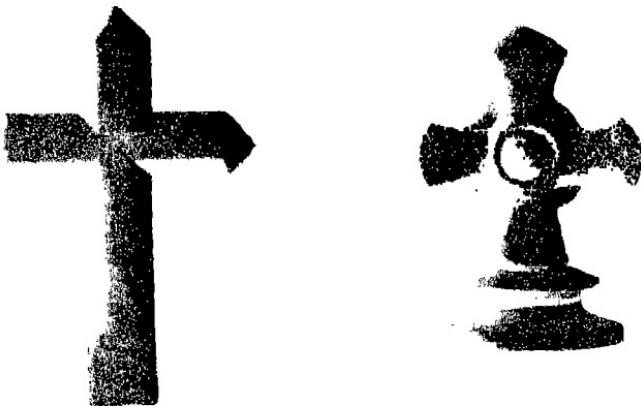


Fig. 29. The cross. Left, the foundation form of the Latin cross, later often richly decorated with carved ornament. Right, the cross of St. George.

In the first place, the floor plan of the church was based on the cross, the long nave being crossed by the transept. The cross appears constantly in a great variety of forms as a symbol of Christian faith and sacrifice. The tall spires are usually surmounted with the cross. It also appears on gables and tombs. Banners, carpets, robes, and vestments used in religious service frequently bear this symbol.

The familiar Greek cross, also known as the cross of St. George, Fig. 29, shows the two arms of equal length bisecting one another at right angles. In the Latin cross the lower limb is lengthened. Fig. 29 also shows a simple foundational form of the Latin cross. This same cross, however, is frequently ornamented with naturalistic carvings of great delicacy and refinement. In St. Anthony's cross, the limbs cross diagonally. Many religious orders each had its own especially designed cross for the order's use.

Characteristic of the Gothic period are the interesting geometric patterns based on the circle, a symbol of eternity, hav-

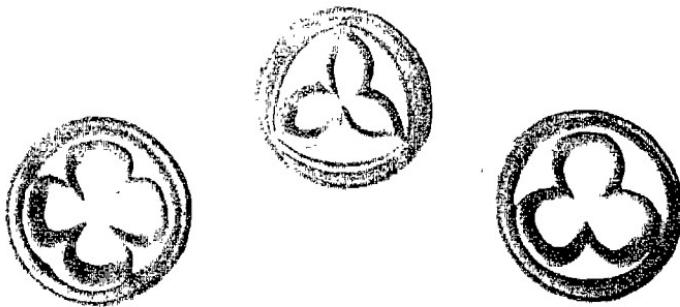


Fig. 30. Geometric patterns. Gothic. Quatrefoil and trefoils.

ing neither beginning nor end. Fig. 30. These geometric forms were new at this time, for they were a departure from the usual forms based on nature. They, however, possessed great originality and charm of form and gave to Gothic architecture one of its chief enrichments. The projecting points in the forms are termed "cusps," and the space between the cusps are known as "foils." These simple forms also had their mystic meanings. The trefoil, three foils within the circle, signified the Trinity—Father, Son, and Holy Ghost. The quatrefoil, four foils within the circle, was named for the four evangelists—Matthew, Mark, Luke, and John. Later these simple forms grew more ornate. In any form, however, they give great beauty to windows, doors, balustrades, and, in fact, to every part of a building where employed.

A very familiar nature form of this period was the fleur-de-lis, suggested by the iris. This was employed as a symbol of purity. It appears as tracery in Gothic windows and was often used as modeled ornament. The coat-of-arms of gallant knights of the period very frequently bore the emblem of the fleur-de-lis.

In Gothic capitals, new and independent forms appear, departing entirely from classic tradition. The early Gothic capital grew out of the Romanesque, which was a bell shape,



Fig. 31. Book end. Historic design is the source of the pattern.

these forms.

Another capital of Christian significance used during this period is one in which the cross of St. George appears in relief. Fig. 32.

Down through the ages these symbols of Gothic art have been employed over and over again. The pointed arch, window traceries, and the earliest of Christian symbols constantly appear in our modern churches and cathedrals.

The adaptation of any historic design to the clay medium may be developed in (1) potter's clay, then glazed and fired, (2) permanent-setting clay, with a pleasing surface finish added, or (3) oil-treated clay. A mold of the model may then be made, followed by a cast in any casting material. An attractive finish may be given the cast. See Chapter Thirteen.

In this study of historic design, the opportunity is afforded the craft worker to make new applications of these age-old forms, and, better still, prepared and strengthened by this study of the past, to forge ahead and develop new goals

inverted. Fig. 32. This fundamental form gradually acquired rich ornamentation, crownings of leaves, flowers, stems, many of them with an upward tendency in harmony with the aspiring style of Gothic architecture. The artists in the great building centers were now constantly drawing upon nature forms for inspiration in design. In fact, during the late twelfth and thirteenth centuries, the field of architectural design was greatly enriched by the renewed and generous use of

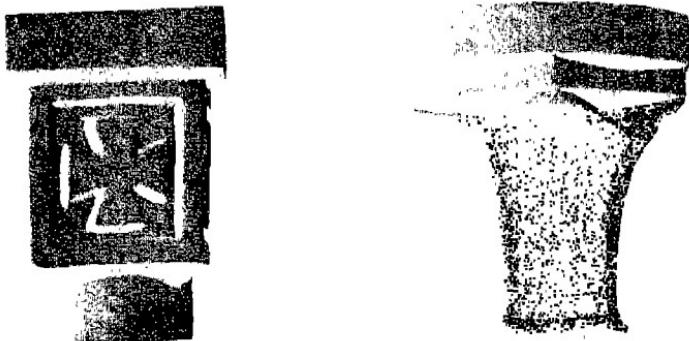


Fig. 32. Capitals. One showing cross of St. George, and the other an early form of Romanesque capital from which the Gothic developed. Gothic, the bell shape inverted, was later richly decorated with carved ornament from plant motifs. See Fig. 14.

in architectural ornament—in fact, create styles or ornament for the here and now—today.

Bibliography¹

- Bossart, Helmuth Theodor, *Ornament in Applied Art*: E. Weyke, 794 Lexington Avenue, New York, New York, 1924.
Brandon, Ralph and Arthur, *An Analysis of Gothic Architecture*, Vols. I, II: David Bogue, 86 Fleet St., London.
Buchlman, Josef, *Architecture of Classical Antiquity and of the Renaissance*.
Lemos, Pedro de, *Art Ages*: The Davis Press, 44 Portland St., Worcester, Mass.
Racinet, DeM. A., *L'Ornament Polychrome*, Vols. I, II (220 plates in color).
Speltz, Alexander, *The Colored Ornament of All Historical Styles*: Vol. I. Antiquity, Vol. II. Middle Ages, Vol. III. Modern Times, A. Schuman's Publishing House, Leipzig, Germany.

¹ The volumes listed may be examined in most public libraries.

Chapter Five

FIGURINES AND THE FIGURE

Never in the history of American ceramics has a decorative idea so captured the imagination of the American public as has that of the modern figurine. In recent years, private studios have been springing up in the East and West to meet the demand, and in the great Middle West long-established potteries have "undertaken" figurines as never before.

The present-day popularity of figurines in the United States began to show itself about 1935-40, during a revival in this country of interest in eighteenth-century antiques. It was during this century in Europe that the popularity of the small porcelain figures made in Germany, France, England, and Sweden was in its heyday. Although China had developed these miniature porcelain figures long before Europe seized upon the idea, porcelain figures as we know them today developed in Germany. They were first created at Meissen by one Johann Joachim Kändler, who is regarded as the father of the art of representing in miniature the people of the day in the dress of the period. Indeed, these particular porcelain figures were the very mirror of fashionable society of the eighteenth century. Figs. 33 and 34.

Surprising, too, is the inspiration which led to these popular figurines. In still earlier days, sugar and wax figures supplied by caterers were used as table decorations. These were arranged to form a kind of landscape, with trees, rocks, temples, and



COURTESY, METROPOLITAN MUSEUM OF ART

Fig. 33. Figurine, from Italian comedy. Porcelain. Modeled by Bustelli, 1760.



COURTESY, METROPOLITAN MUSEUM OF ART

Fig. 34. Left, figurine, English (Derby). Porcelain, 1765. Right, eighteenth century figurine. A ventriloquist with his puppet. German porcelain, 1770.

other decorative objects added. They were placed on the dining table or, if not there, on a side table for the admiration and amusement of guests who found in them a ready source of conversation. Many times candles were placed with the figures and this, later, suggested the porcelain figures with decorated mounts used as candle holders. So it came to be that the beautiful eighteenth-century figurines received their inspiration from the sugar and wax figures produced by the caterer's art, plus the creative genius of Johann Joachim Kändler, the father of the art.

At first, the most popular figures were chosen from the



COURTESY, KAY FINCH CERAMICS, CORONA
DEL MAR, CALIF.

Fig. 35. Modern figurine.

operas. These were usually dancing couples, lovers, crinoline groups, and similar subjects. It was only a step from this, however, to the portraying of real life as it was in that picturesque period. The resulting figures were charming and so caught the glamorous side of the life of that day that they not only captivated the public of their own time but likewise captured the fancy of antique collectors of a later period.

This interest in eighteenth-century figurines became so widespread that about 1939-40 ambitious modern potteries and studios in Europe began turning out figurines portraying contemporary life. These, also, found a ready market in the

United States, but just as the upswing was surging ahead, the war in Europe put an end to production.

Then it was that American designers and craftsmen came forward to fill the breach. Soon hundreds of new producers were coming into the market. Among these were merchandisers, newspaper men, lawyers, housewives, and others without any particular background except their own native genius on which to build. Many of these were making their models at home and taking them to nearby potteries or studios for firing and glazing. Located in the West, in and about Los Angeles, there are today a large number of producers of figurines. In



COURTESY, BRAYTON LAGUNA POTTERY, LAGUNA BEACH, CALIF.

Fig. 36. Mitanda and Jon. From series, "Children of Various Lands."

the East, in and about Trenton, New Jersey, seems to be the figurine area, while in the Middle West a number of long-established potteries are producing figurines of fine quality.

It is surprising to learn that this modern figurine has a long and distinguished ancestry, reaching back to the earliest uses of clay. Even in ancient times these little figures, both human and animal, seemed to meet, then as now, an emotional need of the people. The little terra-cotta figure from the island of Crete, Fig. 38, is only one of the many early figurines on record, dating 1800–1600 B.C. This was found with a number of others in a shrine on the island, having been placed there as votive offerings. But note the record of Cretan costume!—the long, wide skirt, open jacket, hip girdle, and large hat!



COURTESY, BRAYTON LAGUNA POTTERY, LAGUNA BEACH, CALIF.

Fig. 37. Eugene and Ellen.

The delightful Tanagra figures from Greece, dating from the fourth and third centuries B.C., are distinguished by their simple grace and quiet charm. They stand from 6 to 12 inches high and are believed to have been painted in delicate pastel colors. Originally, they may have been votive offerings, or they may have been modeled and painted merely to be enjoyed as are figurines today. Figs. 39, 40, and 41.

From India come figurines in bronze, dating from the seventh century. Some of these are under 4 inches in height. From ancient China come many figurines in both human and animal forms.

Centuries ago the Chinese buried with their dead small



COURTESY, METROPOLITAN MUSEUM OF
ART

Fig. 38. An ancient figurine. Painted terra-cotta figure of a lady.
From Island of Crete,
1800-1600 B.C.

During the Gothic period, religious statuettes or figurines were made of ivory and painted in blue and red, and many of these were used in the churches. Later, during the fifteenth and sixteenth centuries, figures of the Nativity scene were among the popular subjects for figurine modeling. Fig. 45. These were usually terra cotta, to which color was added. When completed the figures were assembled in various pleasurable [58]

clay figures representing their servants in life, whose duty it was to wait upon the disembodied spirit. These also included figures of their favorite animals, that likewise might be of use in the future world. Figs. 42, 43, 44. The saddled horse, ready for his rider, is one of these, and one of the most important horses yet recovered. He is a piebald steed with a luxurious, flowing mane, and is handsomely caparisoned. The saddle cloth is enriched with designs of the period and the elaborate trappings are so well preserved that the importance attached to a great man's horse in early Chinese times is very evident.

In China, the camel represented trade, and many such figures have been found. Dating from the same period is the dog, probably a pet.



COURTESY, METROPOLITAN MUSEUM OF ART

Fig. 39. Girl dancing, painted terra cotta. Greek, third century B.C.

chapter in figurine history has not yet been written. It may be that some day America may awake to find herself a leader in the art.

Notwithstanding the fact that many producers with little background or experience in modeling have been successful in turning out acceptable pieces, it remains true that, from an artistic point of view, some knowledge of figure modeling, composition, and color are an advantage of considerable value to one working in this field. Further, coupled with this is a technical knowledge of processes which it is to the designer's advantage to understand, especially the designing of figures

ing arrangements. The subject continues, even in modern times, to be a favored theme for the modeling art. The Renaissance also produced the master craftsman, Benvenuto Cellini, who modeled figures in clay, cast them in bronze, and decorated them in gold and enamels.

This long line of ancient miniature figures leads directly down to the eighteenth century, where the art of the figurine seems to have been perfected. Today these eighteenth century figures picture to the modern world the gay life of that long-ago period—dancers, magicians, masqueraders, actors, and many striking episodes from popular plays. The next



Fig. 40

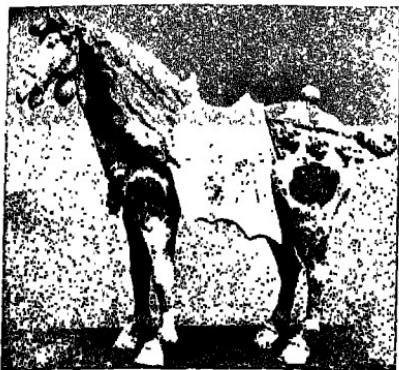


Fig. 41

Fig. 40. Girl with mirror arranging her hair. Painted terra cotta, fourth century B.C. Fig. 41. Draped figure. Painted terra cotta. Greek, third or fourth century B.C.

and the relation of the design or composition to the making of molds and casting. For instance, if the design of a figure is such that there are many projecting parts, or undercuts, it is well for the amateur to know this before planning his model. Otherwise, he may be much surprised to find the amount of time and labor involved in preparing a mold for such a figure. Many of the eighteenth-century figurines were so complicated that a separate mold had to be made for head, arms, legs, parts of the drapery, and ornament; then, using slip as a kind of cement, the pieces were very carefully assembled.

Modeling of imaginative figurines by both the amateur and professional is a delightful adventure. One does not feel re-



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Fig. 42

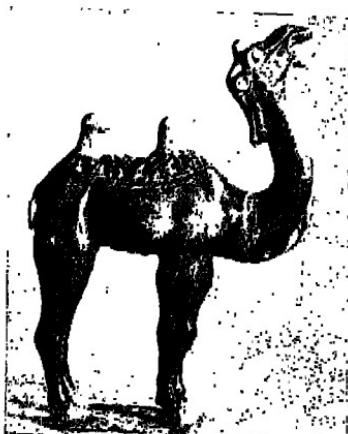


Fig. 43

Fig. 42. Tomb figure. A glazed terra-cotta horse, saddled and ready for his master's use. T'ang Dynasty, 618-907 A.D. Fig. 43. Tomb figure. Camel. White earthenware with transparent glaze. T'ang Dynasty, 618-907 A.D. Fig. 44. Tomb figure. Hound, ready to accompany his master. White earthenware with a thin glaze in cream with touches of green. T'ang Dynasty, 618-907 A.D.



Fig. 44

stricted, and consequently enjoys a certain freedom in working out his idea. Such figures may be modeled in either of the following clays:

(1) OIL-TREATED CLAY. This is the clay generally used by designers and sculptors.

(a) A mold may be made of the model, and from this a plaster cast.

(b) A mold for slip casting may be made and from



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Fig. 45. Nativity Group. Rossellino. Fifteenth century, Florentine. Five figures in painted terra cotta. The Virgin, 34 inches in height.

this a clay reproduction which must be fired for permanence.

(2) POTTER'S CLAY. This is a clay which calls for firing and glazing.

(a) The model, as completed, may be fired and glazed. The clay must be removed from the inside, leaving the wall about $\frac{1}{2}$ inch in thickness. Thickness of wall depends upon the size of figure.

(b) A mold may be made for slip casting, or clay reproduction, which calls for firing and glazing.

(c) A mold for plaster casting may be made and from this a reproduction in plaster, which calls for a proper finish.¹

For first efforts in the modeling of an imaginative figure, it is best to choose one that is compact in form and well supported at the base, such as a seated or reclining figure. Clay will sink under its own weight and, if the figure is not well

¹ See plaster casting, p. 177. See slip casting, p. 160.

supported, the clay sags and the figure loses its form. If attempting to build a standing figure, it should be supported at the base. Sometimes a bit of drapery, the dress, or other device may serve the purpose. If the figure is small, wooden pegs, matches, or similar temporary supports may be run into the clay and allowed to remain until the clay becomes firm; then they may be removed. Sometimes small figures, of weak structure, may be supported on the outside by rolls of clay later removed when the figure can support itself. If

large figures are planned, a framework of wood and wire is used as a support and the figure built upon this. Such a framework is known as an "armature." Fig. 46. Figure armatures as well as those for animal forms are often supplied by dealers in art supplies.

Figures which are to be fired must have no supports of any kind. If left within a model, shrinkage causes the clay to break.

MODELING A FIGURINE

A sketch, a picture, or a model of the proposed figure should be at hand in order that the modeler may have a definite idea of that which he hopes to accomplish. Since a well-supported figure and one compact in form is best for first efforts, such a figure will be considered. Fig. 47D.

All figures, whether small or large, human or animal, are

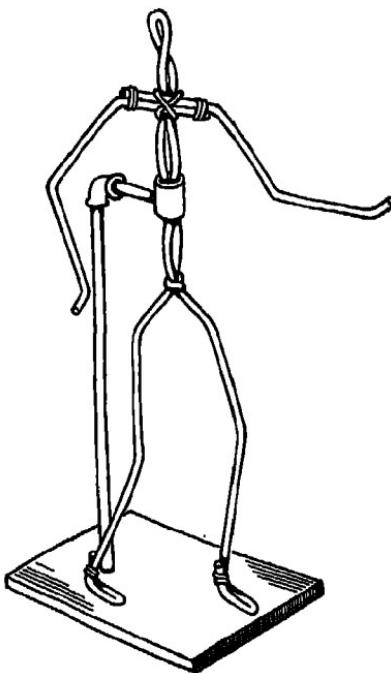


Fig. 46. Figure armature.

seen as made up of mass forms, which include the following:

(1) Main or dominant masses.

(2) Subordinate or minor masses. (There may be several degrees of minor masses.)

(3) Details.

Proceed as follows:

(1) With the sketch, picture, or model at hand, decide upon the main masses of the figure. For instance, as in Fig. 47A, from the top of the figure to the shoulders may be considered one mass; from the shoulders to waist, a second mass; from waist to base, including legs and feet, a third mass.

(2) Take a batch of clay about the size of the largest mass. Place in position upon the modeling board or plaster bat. Since the figure needs more clay, the masses must be built up.

Begin by adding pieces of clay, wedging these into the main mass until the general shape is only roughly indicated. At this stage, keep the clay a little undersize, thus making allowance for the clay to be added in building up the figure. Fig. 47A.

(3) When the masses are fairly well built, indicate each in the clay, and give each the approximate position of the model.

(4) Begin indicating the minor masses, cap, arms, hands, legs, feet. Consider these smaller masses in the same way, building up the general shape to conform to the model. Fig. 47B. Do not smooth.

(5) Under no circumstances attempt to complete any part of the figure at this stage. Go all over the model, again and again, each time improving the modeled surface as a whole.

Add clay where necessary—rolls of clay where areas are large, small pellets of clay where areas are small.

Remove any excess of clay with the wire tool. Fig. 47C.

At this stage, it is essential that the figure be placed on a plaster bat in order that it may be turned and studied.

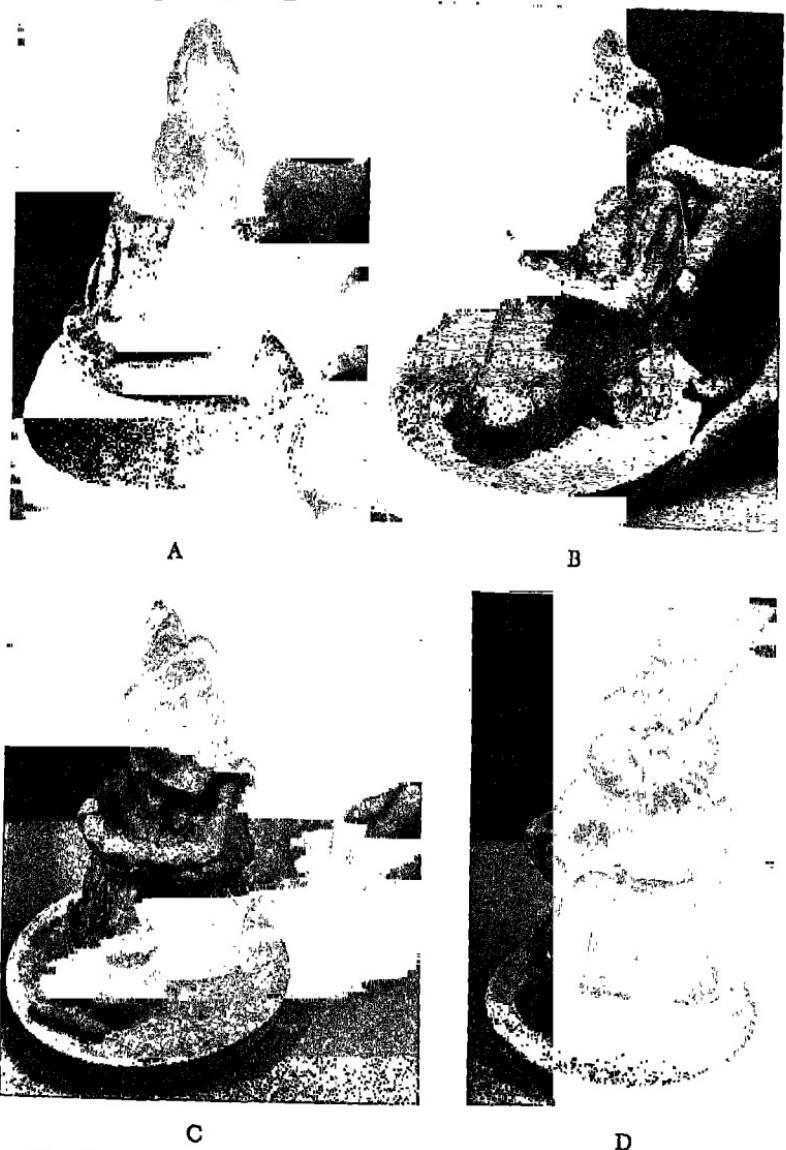


Fig. 47. Processes in building a figurine. A. Building up the main masses. B. Main and subordinate masses indicated and given position of model. C. Building up model and removing clay where necessary. D. Adding details.



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Fig. 48. Modern figurine. "Fru Fru" the French poodle, clipped in the smartest fashion.

Invariably, in all figure modeling, the amateur works toward finishing one part of the figure without due regard to the complete model. With the figure on a bat, constantly turning and studying from all sides, the beginner soon acquires a "feeling" for the figure as a whole.

Working in this way no effort is lost, for all sides of the figure are brought to the point of completion about the same time.

(6) Constantly turn and study the model from all sides, adding clay here, if necessary, and pinching off there, refining each part more and more.

(7) Details are the last to be considered. If the figure is small, features may be indicated only. The eyes and mouth may be incised or merely suggested with the aid of a tool, and



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Fig. 49. Modern figurine. Colette, the wire-haired terrier.

the nose indicated by a bit of clay. Fig. 47D. If the figure is to be glazed and fired, it is not necessary to model features, since these may be painted in with glaze. Figs. 35 and 36.

(8) When the model is completed, it should be smoothed. Going over the surface with the moistened fingers helps to give a satisfactory finish before setting aside to dry.

If the figure is to go through the kiln, it must be left until only leather-dry. When in this condition, the clay must be removed from inside the figure, leaving a wall about $\frac{1}{2}$ inch in thickness. After this is accomplished, the piece is set aside to become bone-dry. It is then ready for the first, or biscuit, firing.

Modeling direct from the figure, either human or animal, is a distinctly different experience from that of building up an imaginative figure. There comes a time when the "art of seeing" needs to be stimulated and though modeling from posed



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Fig. 50. Modern figurines.

figures is not essential in simple figurine modeling, knowledge of the figure, its structure and proportion, does, however, go far toward making any result an artistic achievement.

A surprisingly helpful way of gaining a knowledge of the figure, both human and animal, its structure, proportion, and surface areas or planes, is in the study of master models, especially those in blocked form, in which the planes are indicated. This does not mean that such are to be copied but only thoughtfully observed and studied in relation to the figure itself.

In such study, one learns much about the structure that



Fig. 51. Blocked cat showing planes.

produces the form. The form (that is, basically, the structure) has much to do with the determining of surface areas, which, in turn, decide the planes. One also comes to recognize the importance of shadow areas and the relative unimportance of details. This study so trains the eye that automatically one applies such knowledge to any modeling he may do.

The blocked areas or planes of the surface are of various shapes, depending upon the different directions the surface

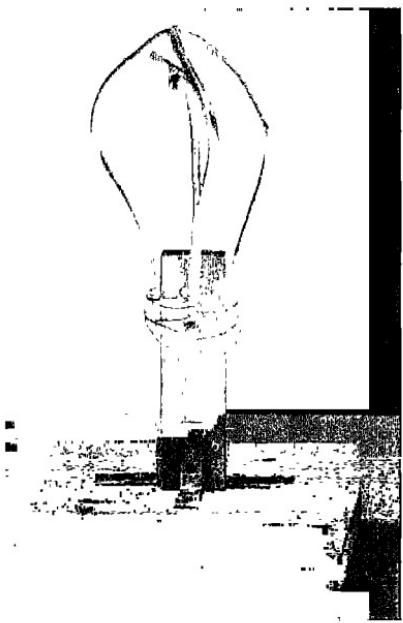


Fig. 52. An armature, often used in modeling a head.

With such practice in figure modeling, the modeling of figurines becomes comparatively simple, greatly influenced and decidedly helped by the finer appreciation of the essentials—structure, proportion, and the modeled form.

MODELING A HEAD ON AN ARMATURE

In modeling a head, whether imaginative, from a cast, or from life, the same constructive way of working is followed. If an armature is necessary, this may be of wood, or wood combined with wire and lead piping. When the head is supported by a base, allowance is made in the height of the armature.

In Fig. 52, the center shaft of wood is raised to the height required. The two pieces of lead piping ($\frac{1}{4}$ inch) are crossed and brought down and firmly fastened in place. Care must be taken that at no place the lead piping comes near the clay

takes. Each direction is blocked, as if flat, and, where plane meets plane, a ridge is formed.

Fig. 51 shows a modeled form with the planes indicated. After these planes are located correctly, the matter of completing a figure is relatively simple. The ridges between planes are rounded, plane merging into plane, small bits of clay added where necessary to make the transition from one form to another, corners rounded, and, finally, any details added.

surface. The "butterflies" at the top are two small pieces of wood held together by wire and fastened to the lead piping where the two pieces cross. This helps to support the clay.

In modeling a head, callipers are used to secure the correct measurements. The following steps are followed in order:

(1) Building up. Begin by wedging the clay about the base of the armature and building this and the neck only fairly well, mainly as a support. Fig. 53.

Fill the clay inside and around the armature, wedging firmly to eliminate air.

Form clay of head into an oval shape. This form should be kept undersize to allow for building up.

(2) Sketch center vertical line on clay—also horizontal lines, as guides only, showing where the eyes, nose, and chin will come.

Balance each side of center line. Give head correct pose.

Since the placing of the features is governed by the distance of each from the chin, the important point to locate first is that of the chin. To identify these various measurements on the clay, little wooden pegs are used. (Broken matches will answer the same purpose.) Such pegs are easily adjusted, especially to get the correct projection of a feature such as the nose and chin, by pushing into the clay or pulling out to the correct distance.

To locate the chin, the pit of the neck must be determined and a peg placed here.

(3) With this as center, get the distance from pit of neck to chin. Peg this chin point.

Study the chin in profile to get the correct projection, adjusting the peg; then build up around it.

The point of the chin now becomes the center for securing all other measurements, which should be pegged:

- (a) Chin to top of nose, between brows.
- (b) Chin to hair line.
- (c) Chin to fleshy notches at ear openings.



Fig. 53. Building up the foundation.
[72]

- (d) Locate eyebrows, describing arcs.
- (e) Locate point of nose, peg. Proceed to get projection in profile and build up.

Other measurements to consider are:

- (a) Width across the face between ear notches.
- (b) Width to outside of eye sockets.
- (c) From tip of nose to back of head.

Numerous other measurements are often taken and will suggest themselves as one works. The above, however, are important points necessary to consider in the correct modeling of a head.

- (4) Press in the eye sockets. Add rolls of clay for the ears.

After measurements have been taken and features located, one proceeds to build up the various areas of the surface, emphasizing especially the bony structure. These areas, varying in size and shape, are seen in the planes. Those of the face are especially important.

- (5) Note the various planes in the model and proceed to develop them in the clay, namely,

- (a) Large area of forehead.
- (b) Two planes forming the sides of the forehead.
- (c) Four planes of the nose, the ridge, two side planes, and under section.
- (d) Two large side planes extending from the cheek bones to the jaw bones.
- (e) Areas between nose and chin.

Continue to study the head from all sides—back, front, profile, and especially from underneath, looking up. This helps one to judge the projections. Next, go to the neck and shoulders. Never work long at any one point; instead, go all over the study.

In completing the model, the addition, as it were, of the skin covering must veil these vigorous forms, that is, the planes, but not conceal them with a too smooth surface which may destroy the structural build-up.

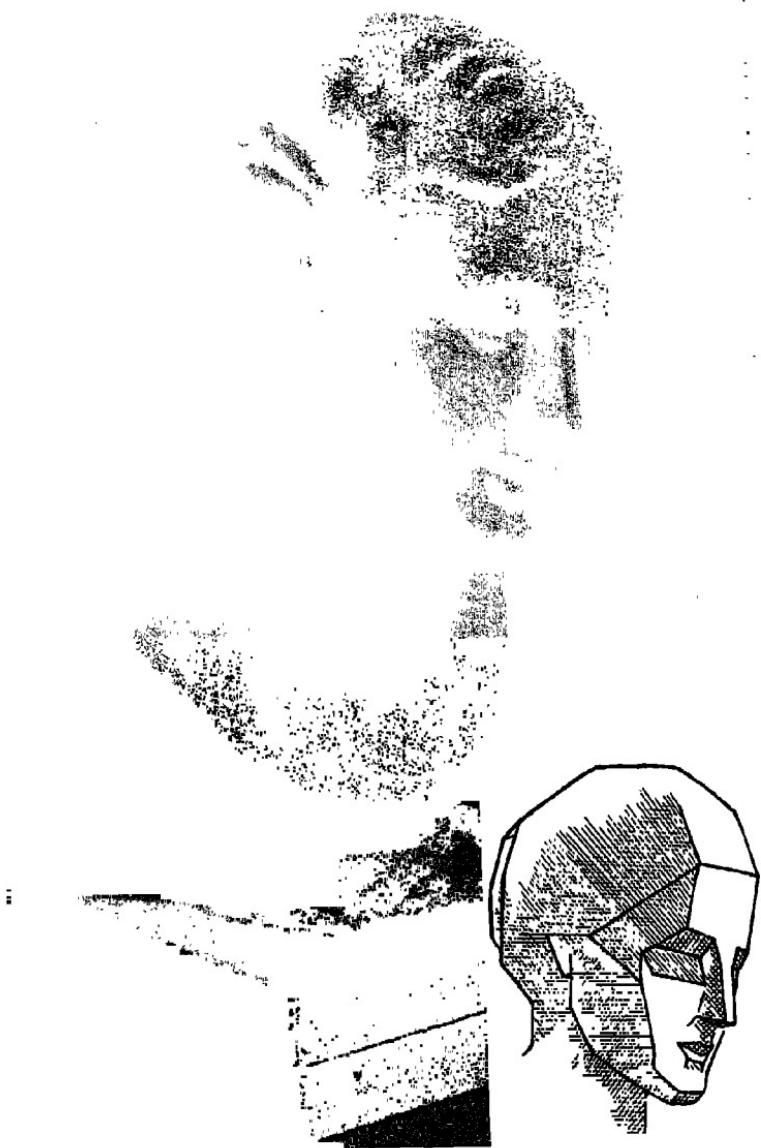


Fig. 54. The modeled head.
[74]

(6) Bring all planes together by adding small bits of clay, making the subtle transitions or adjustments between various forms, blending them, but not losing them.

Constantly turn and work over the entire model until it is gradually brought to a state of completion. Fig. 54.

In today's ceramic field, the unusual popularity of the figurine has been an inspiration to creative workers in clay. Modern designers are composing not only single figures but some are developed in pairs or in groups of three or more with considerable variety in size and posture. Such a group may then be arranged again and again, as the fancy of the collector dictates. Single figures, pairs, and groupings find varied uses aside from the purely ornamental. Many merchandising stores are employing the modern figurine to help sell their goods. One sees them in display windows, placed there with the firm conviction that they lend to the goods shown an interesting note in both color and form. One sees them on candy counters, in flower shops, and numerous other places. In the home, they are frequently used as book ends or to add a decorative note to the book shelves. Again, as of old, they are used as table decoration, as center pieces combined with candles, fruits, and flowers. These new and unusual uses of the figurine are a novel and noteworthy development of modern times.

So it is that, in this twentieth century, the figurine, as old as man, is still new and, though put to new uses, continues to make the same old emotional appeal as it has through the centuries.

Bibliography

- Cox, Warren E., *Pottery and Porcelain*, Vols. I, II: Crown Publishers, New York, New York, 1944.
Hayden, Arthur, *Chats on Royal Copenhagen Porcelain*: T. Fisher Unwin, Ltd., Fleet Street, London.
Schmidt, Robert, *Porcelain (As an Art and a Mirror of Fashion)*: George G. Harrap & Co., Ltd., London, 1932.

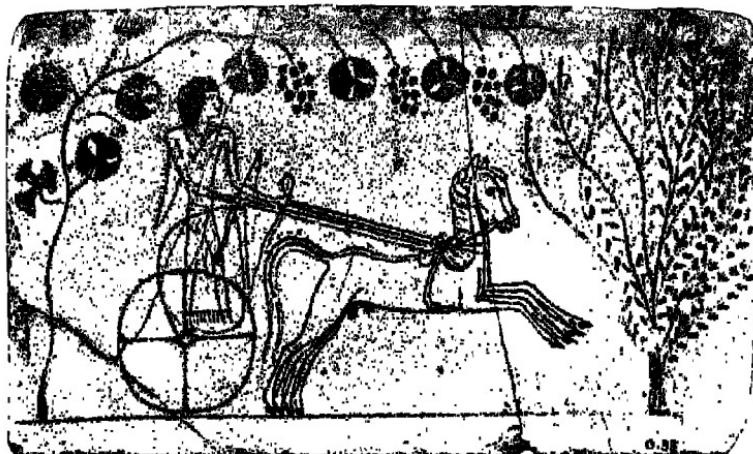
Chapter Six

DECORATIVE TILES

The decorative tile goes back many hundreds of years. As early as 1300 B.C., the Egyptians were making tiles in which the design was incised and into these incisions or grooves was fitted colored glass which, when fired in a kiln, was fused into brilliant and sparkling color. Egyptian tiles of that long-ago period show also figures of men and animals in relief, coated with bright and beautiful enamels—a low-fired glaze.

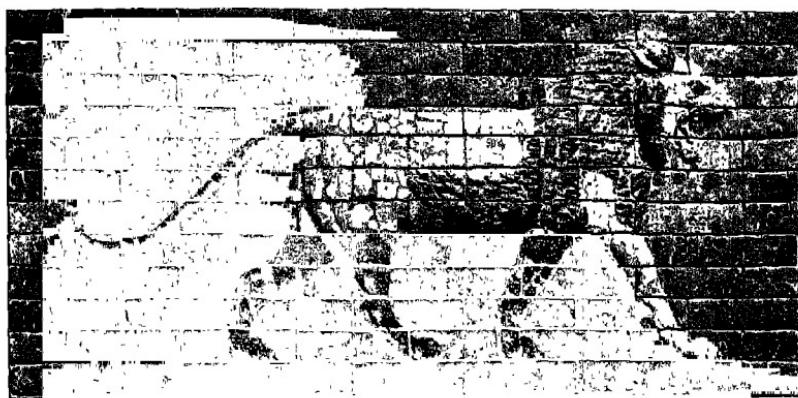
Egyptian craftsmen, as well as their neighbors in Mesopotamia, developed these unusual glazes which they used in the production of tiles and glazed brick. The walls of the ancient city of Babylon were made of glittering glazed brick, each bearing a portion of a pattern which, when fitted together, pictured lions, great winged monsters, and other imaginative creatures. The custom of using the brilliantly glazed brick for both exterior and interior walls was adopted by Persia when at the height of her ancient splendor. Her brilliant blues, violets, and turquoise glazes have scarcely been surpassed.

From the fall of the Persian Empire to the ninth and tenth centuries, little is heard further of the brilliant tiles and pottery of the Near East. It is believed that most of the clays available during these early centuries were dark, probably red and brown, and these, when fired with a transparent glaze which showed the dark body, were not particularly attractive.



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Fig. 55. Egyptian tile. Faience, 1350-560 B.C.



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Fig. 56. Panel of glazed brick from Procession Street in Babylon. Built by King Nebuchadnezzar, 605-562 B.C.

Potters of the East knew that tin added to glaze would render it opaque, but tin was scarce. Consequently, about the thirteenth and fourteenth centuries, they depended upon covering the dark body with a light slip—that is, a liquid clay. A transparent glaze was then added over this. This was a step nearer the goal.

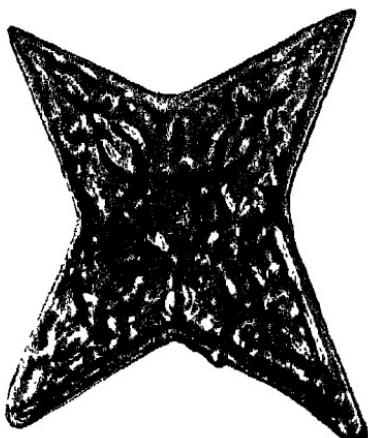


Fig. 57



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Fig. 58

Fig. 57. Persian four-pointed "star" tile with thick blue glaze. Arabesque ornament in relief. Width, $11\frac{1}{4}$ inches. Fig. 58. Persian eight-pointed tile. Gray clay. Brown lustre on white opaque glaze. Two cranes opposed and scroll motifs reserved in white. Brown spots on wings of birds. Width, $4\frac{1}{2}$ inches.

About 1500, many Eastern potters, especially the Moors, were carrying their craft secrets to the Island of Majorca, about one hundred miles off the coast of Spain. Spain was rich in tin and before long tin was added to the light slip and also to transparent glaze, rendering each opaque. With this the difficulty was solved! With a hard, white, opaque coating over the dark body, bright colors could now be used most effectively!

Figs. 57 and 58 show Persian four- and eight-pointed "star" tiles. Each is made of a dark grayish clay. Fig. 57 has been covered with a thick blue glaze to hide the dark body. In Fig. 58 the dark body has been covered with a white opaque glaze. The background is then filled in with a lustrous brown glaze, the design being left in white.

The new ware was given the name "majolica" after the Island whence it came. Later, when carried into Italy, majolica became still more famous.



Fig. 59. Mexican tile in colored glaze, showing four tiles treated as a unit, one fourth of the pattern appearing in each tile. Tiles were glazed and fired separately and then assembled. From Mexico City, Mexico.

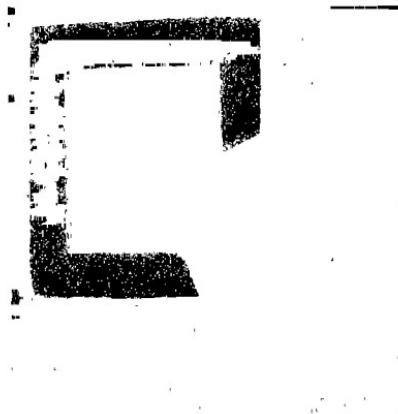


Fig. 61



Fig. 62

Fig. 61. Tile frame and two bases. Fig. 62. Tile showing treatment of base.

The form of the tile should be outlined and filled in with clay firmly wedged into a compact mass to the thickness of approximately $\frac{1}{2}$ inch. It should be smoothed on the one side, turned over, and the reverse side finished in the same way. The use of a wet sponge is an excellent help in smoothing up the surface. If the tile is not well constructed—that is, if the pieces are not firmly wedged together—it may warp or break during the firing process.

Experienced workers often roll out a tile to the proper thickness with a rolling pin and then trim to the desired size. After firing, a 6-inch tile measures approximately $5\frac{1}{2}$ inches. Allowance should always be made for shrinkage, approximately 1 inch to each 12. If several tiles of the same size are to be made, a press mold may be used. See Chapter Twelve, p. 157, Press Molds, Fig. 130.

Another method is that of using a wood or plaster frame with at least two movable bases. Wood frames may be purchased from supply dealers. Plaster frames are very simple to make. Fig. 61. Directions for making plaster frames:

(1) Prepare clay tile, as model, a little large in size, allowing for shrinkage.

(2) Place model in the cover of a cardboard box large enough to give a margin of 3 inches on all sides and with a turned-up edge at least 1 inch high.

(3) Pour plaster, filling margin on all sides and only to the level of the clay model.

(4) After one hour, when plaster has set, remove box cover. Remove model. Set plaster frame away to harden.

The two pieces of linoleum, as bases, should not fit too closely, but only so that the clay tile may be pushed up and through the opening. The tile is then set aside, on the base, to become firmer. If planning a number of tiles, it is an advantage to have several bases.

When the tile is smoothed and ready, the design is transferred to the clay. Place the drawing face down on the tile; then, by firmly rubbing over the paper, the penciled pattern is imprinted on the clay. Remove the paper. With the rounded end of the tool, make a broad line through the center of the line of the pattern. Then, with the broader end of the tool, the clay may be smoothed back into the background. In doing this, the line of the design is given the appearance of a groove with rounded edges. The rounded edges cause the glaze to flow more freely into the line of the pattern. If the edges should be left clear cut, one would be disappointed in the firing, for he would find the white edge of the clay cutting through the glaze.

In grooving the tile, care must be taken to keep the depth and width of the line uniform throughout. After the incising has been completed, the lines of the design and the tile, in general, may be smoothed. The thumb and fingertips, moistened on a damp cloth, serve as excellent tools for this purpose. When about leather-dry, four sections in the base are removed to the depth of about $\frac{1}{8}$ inch, depending upon the thickness of the tile. Fig. 62. This is a precautionary meas-

ure and helps to prevent warping. Lay off a half-inch margin on the four sides of the base and proceed to plan the four areas. Next, carefully remove the clay and smooth the surface. When the tile is to be slip-painted or decorated with glazes, it is safer to prepare the base before the application of color.

If the tile should break or warp with the base treated in this way, it may be that the clay is too plastic. This can be overcome by adding grog. This will make it less plastic. Grog is clay that has been fired (biscuit, not glazed), then crushed. This may next be put through a twenty- to fifty-mesh screen. The prepared clay mixture should be about one-fourth grog.

After becoming thoroughly dry—that is, bone-dry—the tile may be put through the kiln for the first or biscuit firing. Before adding the glaze to the biscuit tile, the base may be coated with a thin layer of paraffin. This prevents the glaze, when the tile is dipped, from adhering to the base. This coating burns off in the kiln, leaving the base smooth and clean. Next, the tile is dipped in glaze, the base wiped with a moist sponge, and it is then ready for the glaze or "glost" firing.

Very frequently, when clay and glaze mature at practically the same temperature, the bone-dry piece, with the base properly treated, may be glazed and fired but once, both clay and glaze developing in one firing. Otherwise, as stated above, the biscuit piece is glazed and fired a second time.

THE TILE IN RELIEF

In developing a tile in relief, the same procedure should be followed to the point where the design is transferred to the clay. If the pattern is a line design in relief, as in Fig. 63, it is more desirable to press back the background than to build up a line. For this reason the tile should be set aside until the clay becomes firmer before beginning the process. If the clay should be too soft, it will be difficult to handle. Later, when the clay is in condition, begin by using the tool to press back the background along the lines of the pattern. It is unnecessary

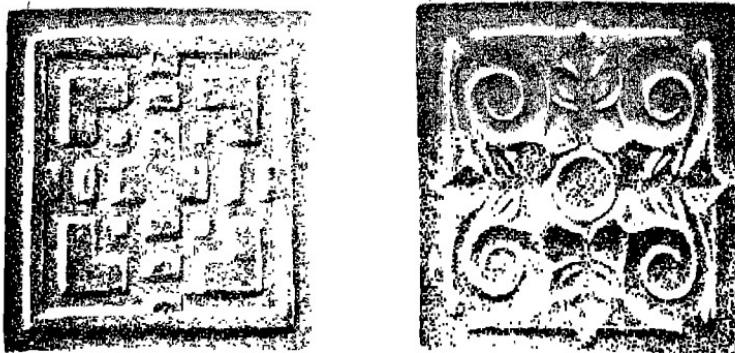


Fig. 63. The relief tile. Line and patterned forms in relief.

to lower the entire background. The smoothing back from the line gives a slightly rounded surface to the whole area, which is an attractive feature. The designs or line patterns, Figs. 60 and 63 (left), are practically the same. It will be seen, however, that the different methods in developing the design produce a distinct change in the appearance of the pattern.

If a second type of design is planned in which the pattern is in relief as in Fig. 63 (right), the highest relief is built up first, working from the highest to the lower areas. When the relief is completed, use the tool to define the forms definitely; then smooth the background. Before setting it aside to dry, prepare the four areas of the base. When bone-dry, it is ready for the first or biscuit firing. As previously stated, however, some potteries have their clay and glazes maturing at such a temperature that the clay with the glaze may be developed in one firing. If such is not provided for, the tile, first having been given a biscuit firing and the base paraffined, is then glazed and fired a second time.

THE INLAID TILE

In developing an inlaid or "encaustic" tile, Fig. 64, the



Fig. 64. The inlaid tile. Tiles made of buff clay, inlaid with red clay.

procedure is similar to that of the incised and relief tile, up to the point of transferring the design to the clay. Here, however, the procedure changes and a new method is followed. Now, with the design on the clay, the part of the pattern that is to be inlaid must be removed and that portion of the design filled in with clay of another color. This is a delicate operation and requires both skill and care.

The preparation of the tile for the inlay should be started only after the clay is firm enough to handle. To insure a satisfactory piece of work, the clay of the inlay must "fit" or be of the same shrinkage as the clay of the tile. This is very important. If the clays do not fit, one will shrink away from the other and thus destroy one's effort.

In removing the clay for the inlay, the line of the pattern may be cut to the proper depth, not more than $\frac{1}{4}$ inch, and then the clay gradually removed, using the wire tool, wooden tool, and possibly a sharp knife. Aim to keep the side walls of the cutout areas vertical with clear-cut edges. Fig. 65. These areas should not be allowed to become dry but should be frequently brushed over with water. They must be kept moist to hold the inlay.

After the pattern has been entirely removed, the tile is

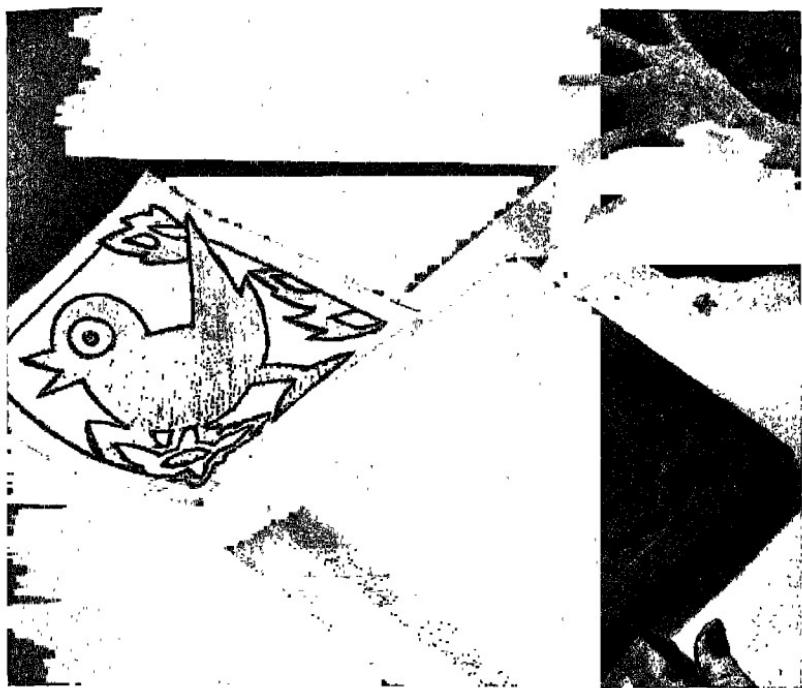


Fig. 65. The clay of the pattern has been removed; the tile is now ready to receive the inlay of red clay.

ready for the inlay. Fig. 65. When filling in the inlay, the bed of the tile must be roughened, and slip made of the clay of the tile must be worked into the clay bed and the inlay wedged into this.

After the inlay has been completed, see that no particles of the two clays adhere to the surface of the tile. Care must be taken to remove such particles; otherwise, they will, when fired, disfigure the surface. Finally, after the four areas of the base have been removed, the piece is set aside to dry. When it is bone-dry, go over the surface very lightly with a fine sandpaper to insure a well-defined edge to the inlay and a smooth surface for the glaze.

If the inlay has been skillfully done, the tile will go through

the first or biscuit firing without a break. After the biscuit firing, tiles in color inlay are given a surface finish of clear, transparent glaze. Consequently, coat the base of the biscuit tile with paraffin, dip in a clear, transparent glaze, wipe the base with a moist sponge, and fire the second time.

A TILE IN SLIP DECORATION

This is an especially interesting project for the amateur, as well as for those skilled in producing beautiful designs. Fig. 66. Slip-painting is by no means a new art. As early as 1000 B.C. the Chinese were producing slip-decorated ware of great beauty. They often combined slip with incised pattern and were expert in handling this technique.

Slip is a thick, creamy substance made by mixing powdered clay and water to which certain metallic oxides are added to produce the color. This chemical knowledge, however, is not always possessed by the layman; consequently, the pottery-supply dealers are furnishing the slips, prepared by experts, in a great variety of pleasing colors.

These prepared slips are known to the industry as "engobes," a name given to the trade by the French. Manufacturers also furnish "slip stains" which may be used for coloring the slip. If, on the other hand, one prefers to experiment in preparing his own slips, as many craftsmen do, this will prove a fascinating adventure. The coloring oxides should be added and ground with the clay before the water is added. The principal oxides with the colors which they produce are as follows: oxide of iron produces red and warm browns; copper, green tints; cobalt, ranges of blue; antimony, yellow tints and, when combined with iron, orange; chromium, opaque greens and pinks; tin, an opaque white. The proportions are one teaspoonful of oxide to nineteen spoonfuls of powdered clay. The colors may be darkened or lightened by adding more or less of the oxide. A small quantity of gum tragacanth dissolved in water adds adhesive quality to the slip. Dissolve a thimbleful of gum

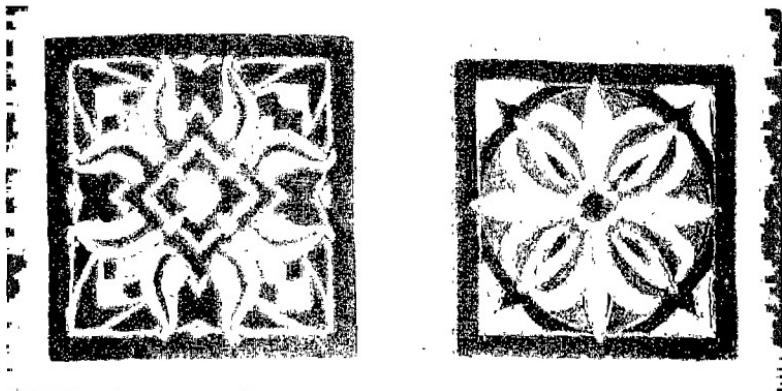


Fig. 66. Slip-decorated tiles. At left, buff clay tile with red slip-painted design; covered with a transparent gloss glaze. Right, buff clay tile with brilliant blue, light green, and gray-yellow slip-painted design. Covered with a transparent clear glaze.

in one pint of boiling water and keep it on hand for this purpose. It will thicken again but can be easily diluted.

Slip must fit the clay body to which it is applied; otherwise, it will flake. Consequently, in preparing slip, it is safer to use the clay with which one is working and add the coloring material, or at least purchase the slip with the knowledge that it "fits" the clay body. If one is using white, gray, or buff clay, this may be pulverized and ground with a palette knife on a glass slab, then color added. This will insure the slip fitting the body.

In making small quantities for immediate use, it is advisable to grind the pulverized clay and oxide together, add a little of the gum dissolved with a few drops of water, then add sufficient water to make a thick, creamy paste and grind again as before, finally adding enough water to give the consistency of cream, and secure an easy-flowing medium. It is best to mix the slip and wait from twelve to twenty-four hours before using. It should be applied to the freshly made piece while the clay is still moist.

In proceeding with the building of such a tile, first the de-

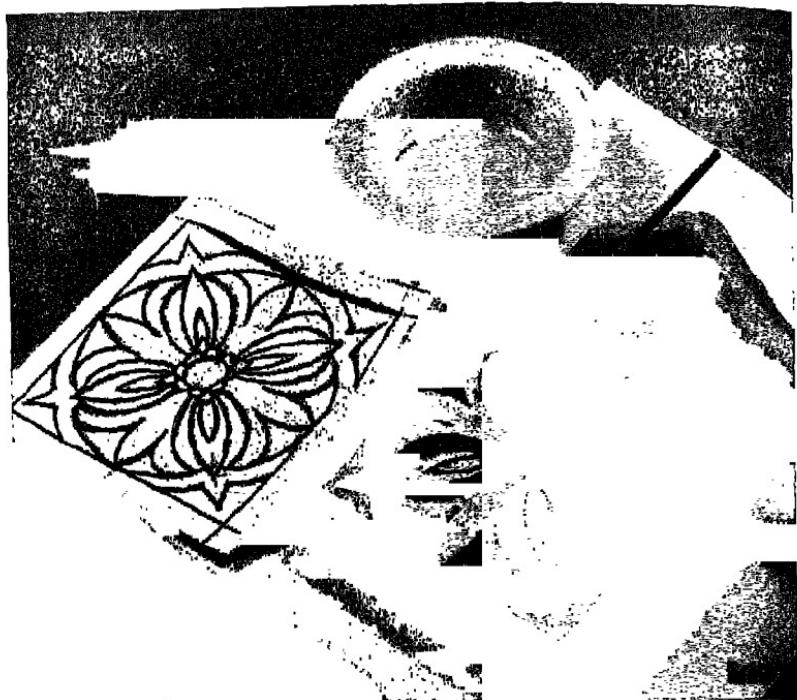


Fig. 67. Applying the bright blue slip to the leather-dry clay.

sign must be planned. One may decide upon a geometric pattern or branch out into a freer form of design with beautiful lines and interesting spaces. All lines of the design should be blackened in with a soft pencil. Before transferring the design to the clay, prepare the base of the tile as previously described, with the four cutout areas. It is not necessary to paraffin the base until after the biscuit firing and before adding the glaze. Next, the design is transferred to the smoothed surface of the tile. If one should wish to outline the design as did the ancient Chinese, incise the pattern before applying the slip. Fig. 67.

It is assumed that the slip is ready to apply. As stated above, it must be applied while the clay is moist. This will cause it to adhere to the clay surface. After completing the painting of the design, the piece is set aside to dry.

When bone-dry, it is ready for the first or biscuit firing. As previously stated, however, some potteries have their clay and glazes maturing at such a temperature that the clay with its glaze may be developed in one firing. If such a plan is not provided for, the tile with its slip decoration must be given a biscuit firing. Next, the base is paraffined, after which the tile is ready for the clear, transparent glaze. After glazing, sponge the base free of all particles of glaze. The tile is then ready for the final firing.

A TILE IN UNDERGLAZE DECORATION

For this type of tile, free, fanciful designs with areas of varying size are especially interesting. Fig. 68. Although geometric patterns are always acceptable, such patterns, especially if the design becomes intricate, are sometimes difficult to handle in colored glazes.

First, plan the design, aiming for beautiful lines and a pleasing variety in the space areas. The design should be complete in both line and color before beginning with the clay. Select colors carefully, and aim to repeat the main colors in



Fig. 68. Tiles in underglaze decoration. At left, gray clay tile; background, bright yellow; design, bright blue with green in waves; outlined in black. Finished with a clear, transparent glaze. Left, gray clay tile; background, light green; sunflower, yellow; center and stems, brown; leaf, dark green. Outlined in black. All-over clear, transparent glaze.

subordinate areas. This helps to give balance to the pattern.

After the design has been completed, prepare the tile. When it is smooth and firm, transfer the design, the lines of which have been blackened in with a soft pencil. Next, begin defining the pattern by pressing back from each side of the line, leaving it raised and approximately $\frac{1}{16}$ inch or less in width. This will form a raised line between areas and keep the colors from mingling when going through the kiln. See that the edges of the lines are rounded so that the glaze will flow.

Another method in securing this line is that of outlining, with a small brush, each area with a fine line of slip and, as the line dries, going over it again and again until it is sufficiently high.

When the tile has been smoothed and is somewhat firm, cut out the four areas of the base and set it aside to dry. When it is bone-dry, two methods are possible for glazing and firing, depending upon the maturing point of clay and glazes:

Method A

- (1) In the bone-dry stage, the tile is given the biscuit firing.
- (2) The design is then painted in, in underglaze colors, and the tile fired to develop these glazes.
- (3) The tile base is paraffined, and the piece is dipped in a clear, transparent glaze, the base sponged off, and the tile fired the third time.

This means three firings to complete the piece. This is the usual method followed in schools and studios.

Method B

- (1) The tile in green clay, but bone-dry, is painted in underglaze colors to complete the design.
- (2) The base is paraffined, the piece dipped in a clear, transparent glaze, the base sponged off, and it is ready for the kiln.

This means that the clay body, the underglaze colors, and the final transparent glaze are developed in one firing. This method is followed where the maturing point of clay and glazes is practically the same.

In the application of underglaze colors to either the bone-dry or biscuit piece, a camel's-hair brush should be used. After applying glaze, avoid, if possible, going over the glaze-painted surface. The glaze should be kept thin. If it becomes heavy, the piece will probably come from the kiln flecked with little holes.

After the different areas have been covered, begin the outlining. Black is effective for this, though, of course, the designer may use any color he prefers. If one so wished, he could do the outlining first and follow by filling in the different areas.

After having followed either Method A or B above, in completing the tile, the finished piece will come from the kiln with a clear, transparent glaze, covering and thus protecting the underglaze colors.

This final transparent glaze not only protects the underglaze colors, but gives the proper finish to the clay body which, otherwise, would be in biscuit form.

A TILE IN OVERGLAZE DECORATION

Overglaze colors are applied after the body glaze, usually transparent, has been fired. Fig. 69.

First, the design is planned in both line and color. Next, the tile is built and the four areas of the base removed. When bone-dry, the tile is given the first or biscuit firing. After coming from the kiln, the base is paraffined and the tile dipped or sprayed with glaze, usually clear and transparent. The piece is then fired the second time. If, however, the maturing point of clay and glaze is practically the same, the bone-dry tile may be coated with glaze, the base sponged off, and the piece fired but once.

With the glazed surface completed, the piece is ready for



Fig. 69. Tile in overglaze decoration. Buff clay tile; clear gloss glaze. Colors violet, green, yellow applied over clear glaze. Outlined in black.

final firing, which develops the overglaze colors at a lower heat than was the body glaze.

the design. The pattern is then sketched on the glazed surface, or it may be traced with carbon paper, and the lines more clearly defined, if necessary, with India ink. These burn off in the firing.

Prepared glazes are used for this form of decoration and are applied with a camel's-hair brush. The matter of outlining is left to the taste of the designer. When completed, the tile goes to the kiln for the

A TILE IN SGRAFFITO DECORATION

This method of decoration is interesting, especially since it has been practiced from ancient times down to our own modern day. It was made famous in this country by the early settlers in Pennsylvania, the Pennsylvania Germans. A choice collection of early work, both in slip-painted decoration and sgraffito ware, may be seen in the Pennsylvania Museum of Art.

The practice is said to have originated in localities where only two kinds of clay were common. As early as the tenth century, the method was widely practiced in the East, in and about the Tigris-Euphrates valley. The body of the wares which have been found in that area is dark red. This was completely covered with a light slip which was cut away in various patterns to form designs showing the red body color. In more modern times, both Mexican and Indian pottery has been decorated in this manner. The ware is built of one color

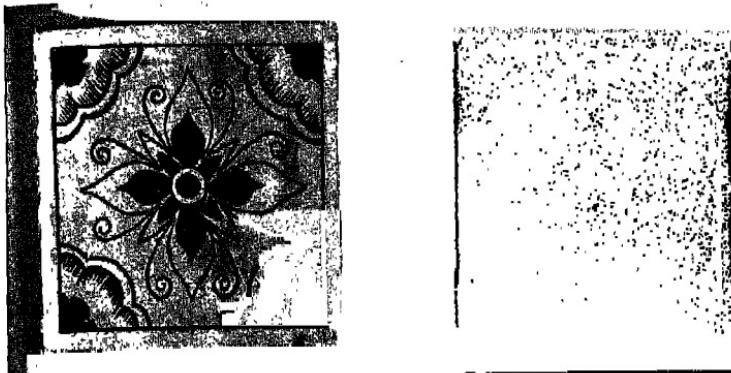


Fig. 70. Tiles in sgraffito decoration. At the left, red clay tile covered with a light slip. The slip has been scratched away to the foundation color, thus showing the design in the red underbody. An all-over clear, transparent glaze completed the project. Right, buff clay tile with incised line (after ancient Chinese pattern). After being dipped in red slip, the surface was scratched away, leaving the red slip in the incised line forming the pattern. Finished with an all-over clear, transparent glaze.

and when leather-dry is covered, probably by dipping, with a slip of light color. Before this is completely dry, the design is cut or scratched through to the foundation color. Hence the "sgraffito" or "scratched" ware, a name given to it by the Italians, who practiced the art extensively.

In developing a tile in this style of decoration, decide first upon the clay for the main body of the tile. Compare tiles. Fig. 70. Designs may be planned for surface decoration as in the first tile, or the pattern may be incised as in the second.

In developing a surface pattern, plan the design first, carefully considering its appearance when the body of the design is scratched through to the foundation color. Next, build the tile, smooth the surface carefully, and remove the four areas in the base. Set aside to become leather-dry.

The slip bath of light color is then prepared by dissolving powdered clay in water until it is of a creamy consistency. Before dipping the tile, moisten and slightly roughen the surface by going over it with a moist sponge. This will cause the

slip to adhere more readily. When ready, it is dipped face down in the bath of slip, held for a second or two, then turned face up and set aside to dry. The tile may be given two or three such coatings if necessary. It should be sufficiently heavy to show an effective pattern when scratched through to the foundation color.

When leather-dry, the design is sketched on the coating, or it may be traced. Then, with a sharp knife or a tool for the purpose, the coating is scratched from the solid parts of the design, making a clearly defined edge to the pattern. When this is completed, the tile is set aside to dry thoroughly before firing.

In making a design for an incised pattern, the method differs somewhat. After planning the design and preparing the tile, including the four cutout areas of the base, the pattern is transferred to the surface and the lines of the design are incised. The tile is then set aside to become firmer but not dry.

Next, prepare the slip bath of contrasting color. When ready, go over the tile surface with a moist sponge, slightly roughening it. This will help to hold the slip coating. Next, dip the tile, face down, and hold for a second or two in the bath. Then immediately turn face up and set aside to dry.

The slip settles in the incised lines of the design as well as coating the surface. Such a design may need several coatings to bring the slip up to the face of the tile. Continue the dippings until the surface appears satisfactory for the next step, that of removing the surface coating. When satisfactory, set aside until about leather-dry.

With a knife or tool for this purpose, the surface coating is then scratched away, leaving the contrasting color in the grooves of the pattern. Next, go over the surface lightly with a fine sandpaper to smooth it. Then set aside to dry thoroughly.

Both tiles are now completed to the same degree; that is, each has been set aside to become bone-dry. Next, each is



Fig. 71. Tiles in pierced design. Gray clay tiles, patterns pierced; finished with bright yellow gloss glaze and powder-blue gloss glaze.

given a biscuit firing to be followed by a transparent glaze. Before glazing, however, coat each base with paraffin; then dip or spray each tile with a clear, transparent glaze. Sponge off the base of each, and it is ready for the glaze or "glost" firing.

The illustrations, Fig. 70, however, were fired but once, the one firing developing both clay and glaze.

A TILE IN PIERCED DESIGN

Like many famous clay techniques, the practice of developing reticulated or pierced designs also goes back to the ancient Chinese. A tile with pierced design would seem rather fragile, but firing transforms the fragile into a very durable state. Such tiles when well designed and executed make a beautiful and useful ornament for the table. Solidity is given the piece by the solid center, the size and shape of which is planned by the designer. Caution must be exercised in planning a pierced design to see that the open spaces are not monotonous in either size or shape, and that the connecting lines are of such a width that they also may add solidity to the piece. Such a tile may be planned $\frac{1}{2}$ inch in thickness or

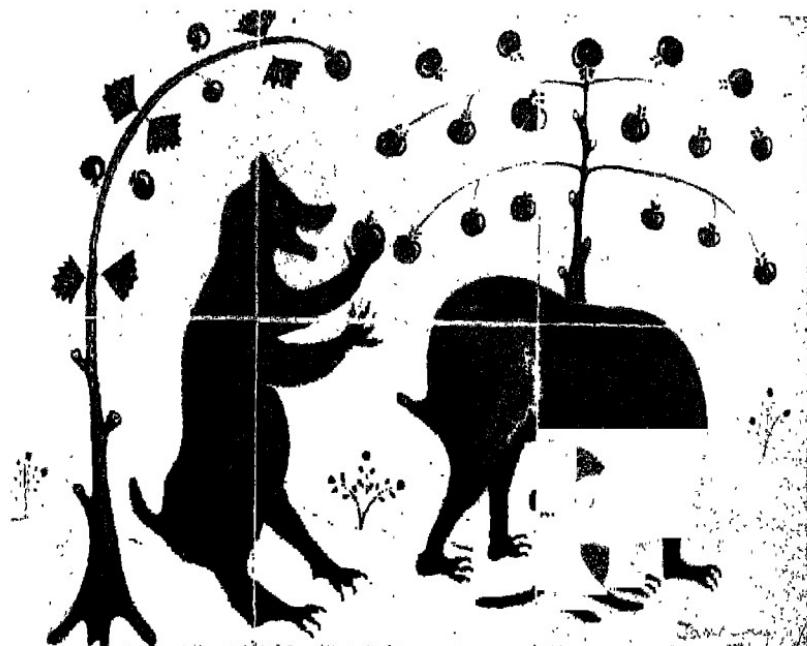


COURTESY, CAROL JANEWAY STUDIOS, NEW YORK CITY

Fig. 72. Table top of twelve 6-inch tiles. Tiles were assembled and painted in underglaze colors as a unit, glazed and fired separately, then reassembled.

less. Any thickness beyond $\frac{1}{2}$ inch is difficult to pierce or cut through. Before piercing the design, it is advisable to cut out the four areas of the base to about $\frac{1}{8}$ inch or less.

After the design has been planned, the lines, which should be fully $\frac{1}{4}$ inch in width, should be blackened with a soft pencil. When the clay tile is firm but not dry, it is ready for the pattern. Do not allow the clay to become dry while cutting out the pattern, for it may break in the handling. The design is then placed face down and transferred to the clay. A small penknife is best for cutting out the design, cutting on the line of the pattern. When a section of the design has been



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Fig. 73. Table top of six 6-inch tiles; subject "Adam and Eve." (Could be used as a cocktail tray in which a thinner and lighter-weight tile would be used.) Assembled and painted as a unit; glazed and fired separately, and reassembled.

so cut, the bits of clay to be removed may be pushed through to the other side. As a rule, these pieces fall out readily if the cutting has been well done. After the pieces have been removed, it is imperative that the underside be trimmed and finished as well. Softly rounded edges to the lines cause the glaze to flow freely; also a rounded outside edge to the tile adds to its attractiveness.

After completing the tile, go over the surface with a fine sandpaper and rub with a circular motion until all roughness disappears. Finally, brush over the entire surface with a moist sponge. Set the tile aside to dry slowly until it reaches the bone-dry stage. It is then given the biscuit firing, after which

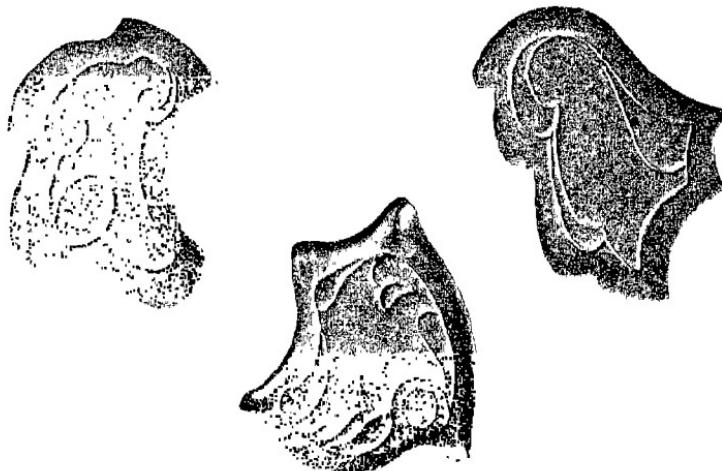


Fig. 74. Modern tiles in rhythmic pattern.

the base is paraffined. It is then ready for the glaze. Usually transparent glazes of delicate color such as powder blue, yellow, pink, and lavender make very attractive tiles. After glazing, sponge off the base and place in the kiln for the final firing. In Fig. 71, both clay and glaze were developed in one firing.

One of the interesting uses to be made of tiles, especially those in colorful design, is that of planning two, four, or more as the top of a table. If the table is wrought iron and the top a frame with a base, the tiles may be merely set in the frame, or, if desired, they may be sealed in with cement. Such table tops, in which each tile is different in design but in the same style of decoration, make an interesting and colorful surface in combination with wrought iron.

Another attractive project in table-top design is that of breaking the full area of the top into tiles and spreading one design over the entire surface. Then each tile, showing only a portion of the general design, is fitted when completed into its proper place in the assembled pattern. Figs. 72, 73. Such

arrangements of tile are also designed for mantelpieces and as a background for wall fountains.

A very modern form of tile used as a support for flower vases, plants, and similar purposes is that in which the tile outline is a series of rhythmic curves and the surface design an incised line in harmony with the rhythmic flow of the general contour. Fig. 74.

The decorative tile opens a wide field for practice in various processes of decoration which may be applied as well to other forms of ceramic work. At the same time, these various possibilities in decoration afford abundant opportunity for the creative artist in the field of design, especially in devising new forms and new uses for this age-old decorative tile.

Bibliography

- Bossart, Helmuth, *Ornament in Applied Art* (Excellent color plates of historic tiles from many lands; also pottery and other historic design); E. Weyke, 794 Lexington Ave., New York, New York, 1924.
Cox, Warren E., *Pottery and Porcelain*, Vols. I, II: Crown Publishers, New York, New York, 1944.

Chapter Seven

CERAMIC ORNAMENT

In today's fashion world, ceramic jewelry, introduced in the early 1940's, is often regarded as an entirely new field in personal ornament. True, the modern designs are new, definitely so, but the use of clay for personal ornament is not at all new but old, even ancient. From time to time through the



COURTESY, THE JANE SNEAD CERAMIC STUDIOS, INC., PHILADELPHIA, PA.

Fig. 75. Modern ceramic jewelry. Pin and earring set in orchid design—white clay with delicate shadings of crimson.

centuries, such personal ornaments made of clay, baked, and sometimes glazed, have pleased the fancy of both men and women.

It is not surprising to learn that clay beads were one of the first ornaments modeled and worn by primitive man. Long before clothing appeared, the string of beads, sometimes chipped from stone, sometimes formed in clay, was an important ornament for the neck and shoulders. The early Anglo-Saxons wore quantities of clay beads. Many of them were formed in variegated clays and often showed very pleasing patterns. A large bead of clay or stone was habitually worn as a pendant ornament.

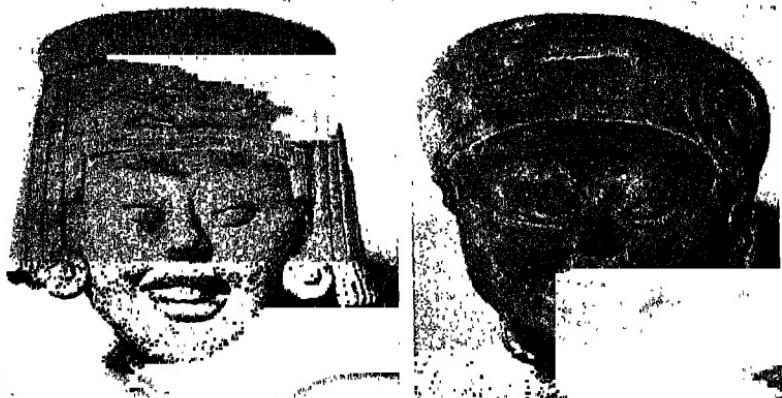
In ancient Egypt, among Egyptians of rank, the natural wealth of gold, silver, and precious stones precluded the use of clay ornaments. The less fortunate classes, however, contented themselves with rings made of clay, glazed and baked.

Among other costume ornaments which from time to time



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Fig. 76. Modern ceramic pin and earring set. Motif, white rose with green leaves.



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Fig. 77. Smiling Aztec heads wearing ear ornaments. Clay, 6 x 6 inches. Found in Vera Cruz, Mexico, fourteenth century.

through the centuries have flowered, then faded, only to flower again, is the now very useful button, which, before its practical value was discovered, was used as an ornament on the dress. Perhaps the oldest record of glazed clay buttons is that represented in the English collection known as the "Lord Amherst Collection." This dates back to the time of Thotmes III, about 1550 B.C. These buttons are oval in shape with fluted lines, are without shanks, and were probably fastened to the dress with glue. Similar ornaments in gold and silver have frequently been fashionable through the centuries and are known as "disks" or "heads." From the Near East and dating about the fifth century B.C. are many of these disks in gold—not only disks but flat animal forms as well, among them the deer and griffin, and these very much resemble the popular lapel pins of today. All were glued to the garment.

In the sixteenth century, a soft paste button made by mixing ground glass with the clay body produced new and exciting results. The buttons made of this material, after passing through the kiln, came out excelling the finest jewels in brilliance. During this century, buttons were in their heyday and,

though gold and jeweled buttons were favored by those who could afford them, the new "lustre" buttons claimed an enthusiastic following.

During the eighteenth century, the name of Josiah Wedgwood is written large in the history of English ceramics. He made a valued contribution to the world in his famous "jasper ware" (1775). This was the name given by Wedgwood to the porcelain bodies with cameo reliefs in white which he perfected. Today, when Wedgwood is mentioned, there instantly flashes to the mind the white cameo reliefs against a beautiful blue background. These cameos were adapted to and used as settings for rings, bracelets, lockets, pendants, and earrings.



COURTESY, METROPOLITAN MUSEUM OF ART

Fig. 79. Wedgwood cameo pin. White on black, set in fine filigree frame.



COURTESY, THE ART INSTITUTE OF CHICAGO

Fig. 78. Aztec ear ornament. Terra cotta, 1 inch in dia., 1 1/4 inches deep. Fourteenth century.

Beautiful examples of jasper cameos exist in museum collections, especially in England. Among the prized pieces in the Old Wedgwood Collection is a bracelet showing eight oval cameos, graduated in size, the largest as the center, three on either side, and a cameo clasp, the smallest in

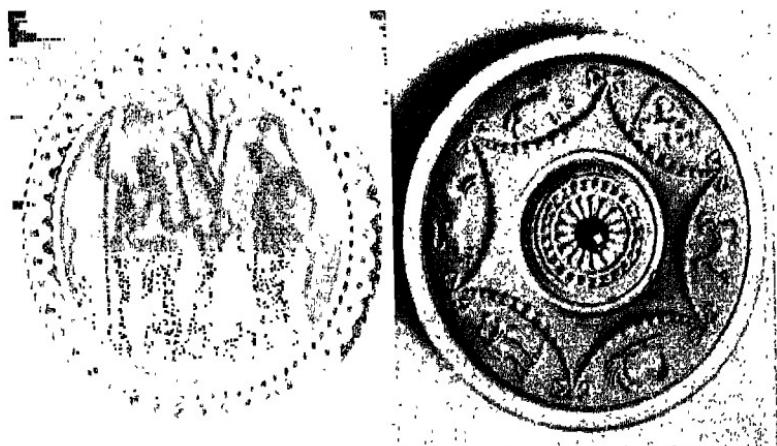


COURTESY, THE ART INSTITUTE OF
CHICAGO

Fig. 80. Wedgewood buckle. White on blue jasper. Steel mount.

size; also, unusual pendant earrings of oval drops, the first small and the lower elongated. Pieces are set in steel, gold gilt, or gold, and the several cameos of a piece are linked together.

Before jasper colors were an accomplished fact, cameos were made in white and buff on a colored enamel ground which was burnt in. In the popular buttons the backgrounds were painted with water color. The buttons were then mounted by professional button makers. A



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Fig. 81. Wedgewood buttons. Blue jasper, cut steel frame, and blue jasper mounted on pearl.



COURTESY, METROPOLITAN MUSEUM OF ART

Fig. 82. Porcelain cane heads. Eighteenth century.

crystal cover and metal backing with a metal shank made them sufficiently durable.

As soon as the new jasper colors were introduced, the Wedgwood potteries produced thousands of subjects for buttons, small gems, jewelry, and every kind of ornamentation. Indeed, so popular were the genuine jasper cameos that they were used for earrings, brooches, rings, bracelets, pendants, watches, in which the cameo was of convex form, and even set in the hilt of dress swords. Such was the ceramic jewelry of the eighteenth century!

The jasper cameos also lent great charm to patch boxes, snuff boxes, scent bottles, and other objects so often found upon Milady's dressing table. Then, as if such uses were not enough to display their beauty, they were set as medallions in the finest furniture of the period!

It is interesting to know that a "Cherokee" clay found in South Carolina was used in making the famous jasper body. In 1767-68, while important experiments were being made, an agent was sent from England to South Carolina to procure this clay.

While the beautiful jasper ware held the lead in ceramic jewelry, other types of ceramic ornament continued fashionable. During this period, canes were the last word in gentlemen's fashions, and owners were vying with one another in securing the choicest of ornamental heads. Fig. 82. At this time, porcelain heads were especially popular. They were de-

signed in various shapes and many of them painted in floral patterns, much after the manner of hand-painted china. About the same period, the porcelain knob or a pattern of other design was a popular choice for Milady's parasol.

In Japan, during the same century, Satsuma buttons were made from a porcelain body. The subjects represented were usually flowers, fish, and animals. Some of these were made of a soft paste body exquisitely colored, glazed, and crackled. The finest of Satsuma buttons are today much sought after by collectors.

Of course, all of these various types of button finally found their way to America, where they were generally worn. In the year 1841, an American button maker, Thomas Prosser, of New Jersey, invented a new process which he describes as "an improvement in the manufacture of buttons." In this new process, the powdered clay, with metallic oxides for color, was pressed in metal molds with such force as to cause the clay to retain the form of the mold. These forms were then glazed and fired. Such pressed clay buttons were worn for many years.

From 1895 to 1914, in both France and America, porcelain disks were painted much after the manner of hand-painted china. After being fired, they were backed with brass and silver disks with metal shanks. Many of these buttons, at present being regarded as heirlooms, are now being made into brooches.

Modern ceramic ornament today is largely produced in private studios or by individuals thrilled with the idea of the creative possibilities. True, the pieces are fragile but, glazed and fired, they are very durable. The beautiful glazes never fade but remain as brilliant as when first taken from the kiln.

To one experienced in the art of modeling, the making of these miniature pieces is no great effort. The clay in the hands of skilled fingers is readily made to conform to the idea in mind. Bird and animal shapes may be modeled following the

same procedure as in figure modeling:

(1) Give the small piece of plastic clay the general shape of the mass.

(2) Follow by working out the more minute details—lines, reliefs, indentures, etc.—with a tool.

The only difficulty is the fact that the piece is small and somewhat difficult to handle.

Another method that may be advisable for those not so fluent with clay is through the use of pattern.

MODELING FROM A PATTERN

Make a drawing of the general outline only, keeping the pattern to the size the piece will be when completed. This may then be cut out and used as a pattern. A small bit of clay is then rolled out, possibly to $\frac{1}{8}$ or $\frac{1}{4}$ inch in thickness. The pattern is laid on the clay and the outline cut. Follow by building upon this flat foundation, piece by piece, the form as planned, using the modeling tool where necessary and plenty of slip, especially when larger parts such as wings of birds, fins of fish, or leaves are added to the background. When completed, the form should be carefully smoothed as much as possible before the clay is permitted to dry. This will make less handling of the piece and less finishing

COURTESY, JESSIE F. BRYAN, MERRY-GO-ROUND STUDIO, ORONO, MAINE

Fig. 83. Modern ceramic necklace. Wild cherry motif. (Native to Maine.) Blossoms, white; leaves, various greens and yellow greens.

to do. After the piece is thoroughly dry, it may be advisable to touch over the surface very, very lightly with the finest of steel wool, removing any superfluous specks or grains of clay and thus insuring a smooth and pleasing surface for the glaze. The piece is then ready for the first or biscuit firing.

MODELING OF FRAGILE PIECES

The more delicate and fragile pieces, such as roses, leaves, and various floral shapes, may be more easily modeled if some simple method which has proved satisfactory is suggested. For instance, in making roses, leaves, and other very thin parts, or petals of flower shapes, use very moist clay and press until very, very thin.

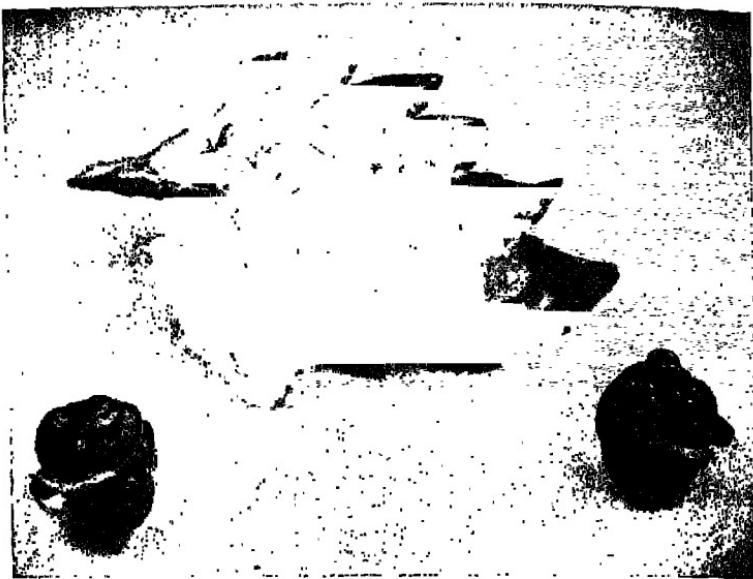
In making a small rose for jewelry, roll out a strip of clay 4 or 5 inches in length until it is possibly $\frac{1}{8}$ to $\frac{1}{16}$ inch in thickness. Cut the strip to the desired width, perhaps $\frac{3}{4}$ to $\frac{1}{2}$ inch. With this thin strip in hand, press the edge, especially, and the full strip if desired, firmly between the forefinger and thumb until it becomes about paper thin. Next, begin rolling the clay. Fig. 84. The center seems to rise naturally, and this should be kept rather high. It forms the compact center of the rose. As the form grows, the remaining length may be formed into petals freehand, or it may be detached from the center and tiny petals cut from the pieces and added to the center until the form is complete. In adding these pieces, a generous supply of slip should be used to insure a firm joining. Petals should be given a pleasing form by turning or rolling the edges. Leaves may be cut from the thinned clay and attached to the main body. These should be given life and vitality by curling and curving the shapes. Some markings, suggesting the veining, may also be desirable. After the pieces are thoroughly dry and smoothed, they are ready for the biscuit firing, after which the glaze is applied and they pass through the kiln again.

Though any of the clays suitable for firing may be used for ceramic ornament, the white porcelain clay is most desirable.



Fig. 84. Rolling the center of a flower form.

The glaze effects over the white body are more pleasing than over the darker clays. Most pieces of ceramic ornament are glazed by applying the liquid with a brush, though it is possible to dip them if only one color is used; or, if several pieces are to be glazed in the same color, the color may be sprayed on. In using two or more colors of glaze on a single piece, great



COURTESY, JESSIE F. BRYAN, MERRY-GO-ROUND STUDIO, ORONO, MAINE
Fig. 85. Blueberry pin and earring set. (Blueberries, native to Maine.) Berries, light and dark blue; leaves, green, yellow green, blue green, gray rose.

care must be exercised in applying the color. Under no circumstances should colors overlap or the tiniest spot of one color fall upon another. Such a mishap is glaringly apparent after the piece has gone through the kiln. Glaze is never applied to the backs of such pieces, though one must use care in applying the color well over the edges and not depend upon the glaze to run over the edge.

Ceramic pieces are placed in the kiln in a horizontal position; hence the glaze does not run as it would were they placed vertically. If a piece comes from the kiln and the glaze is found to be unsatisfactory, it may be reglazed and fired a second time.

After the pieces come from the kiln, they are fitted with the necessary pins and fasteners, which are held in place by jeweler's cement. These supplies are furnished by dealers. Pins for brooches come in proper lengths, 1 and $1\frac{1}{2}$ inches, in

both metal and plastic, and some of these have safety clasps. Earring backs come in clip and screw style in both metal (gold color) and plastic, and these also are cemented to the backs of the pieces. In making button designs, the design may be pierced to permit sewing to the garment; or, if one wishes a shank, a small, light button of suitable size with metal shank may be imbedded in the back of the clay model and allowed to remain until the clay is dry. After that, it can be readily removed and laid aside until the button form has been glazed and fired. It may then be cemented in place. Button shanks, however, are also supplied by dealers.

The use of clay in the modeling of personal ornament has shown an interesting and varied development through the centuries. The ceramic ornament of the present day is entirely different from previous periods both in the choice of design and in its finish. One fact, however, stands forth: through the centuries, the plastic qualities of clay and its possibilities have ever been an inspiration to the creative artist for the expression of original, unusual, and beautiful conceptions of form in personal ornament.

Bibliography

- Barnard, Harry, *Chats on Wedgewood Ware*: T. Fisher Unwin, London, 1924.
Snead, Jane, *The Potter's Primer* (Covers the making of present-day ceramic jewelry.): Jane Snead, Jenkintown, Pa., 1943.



COURTESY, METROPOLITAN MUSEUM OF ART

Fig. 86. A watch set with wedgewood medallion.

Chapter Eight

POTTERY MAKING

From ancient times, pottery making has been a favored craft of primitive peoples. Nearly all prehistoric peoples have made and decorated clay pots, bowls, jars, and other utensils. In our own land the various Indian tribes were making their clay pots and bowls long before the white man came, and their way of working probably was like that of all primitive races.

The clay was usually dug from the hillside by hand with the aid of a shell or stick. As it was gathered, the finer was separated from the coarser, for the fine clay was generally reserved for small pottery forms, while the coarser was more suited to the large clay pots and storage jars. Next, in order to remove all pebbles, the clay was washed in a nearby creek or river. These early peoples also discovered that when working with the clay it sometimes broke; in other words it did not have the required plasticity, or, as is said today, it was "too short." To remedy this condition, finely ground shells and powdered stones were added to the clay body. In this way, the primitives "tempered" the clay and made it more workable or plastic.

Many old pieces of pottery give evidence of having been molded inside of baskets. This appeared the easiest way to give form to the clay. The basket, with the clay shape inside, was set in the primitive kiln and baked. Naturally the basket burned away, but the imprint of the basket was left on the



PHOTOGRAPH BY NEW MEXICO STATE TOURIST BUREAU

Fig. 87. San Ildefonso Indian Pueblo, New Mexico. The designs Julian draws all have meaning. The most common represent the sun, the clouds, the wind, and the rain, for the sun and rain meant life itself to this early civilization.



COURTESY, METROPOLITAN MUSEUM OF ART

Fig. 88. Predynastic pottery bowl. Egyptian; 7 inches in diameter. The white line decoration is a typical primitive border, and suggests the feeling of basket origin.

outside of the clay jar. This leads to the belief that basket-making preceded pottery making, which may have been suggested by the earlier weaving of baskets. The working round and round upon a basket naturally led to the conclusion that clay could be formed in the same way. This not only accounts for the primitive method but for the present-day method of hand-built pottery as well—the coiled method.

It is also worthy of note that the print of the basket upon these early shapes was a source of ideas for decoration. Such imprints upon the clay no doubt suggested the simple designs so characteristic of early work—that is, the simple incised line, the zigzag, and the scroll patterns. One idea soon led to another and gradually the native worker passed from the simple incised line to painting with colored clays upon the unbaked surface. Nor does the decoration remain limited to line arrangement, for among later pieces are motifs from nature, both flower and animal, and in our own country many symbolic forms from Indian lore, including the swastika, the thunder bird, clouds, rivers, mountains, and numerous other favorite patterns.



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Fig. 89

Fig. 90

Fig. 89. Vase with five openings. Lotus decoration. Egyptian, Twelfth Dynasty.

Fig. 90. Vase. Three handles; decoration of scrolls, an early type of pattern.

Cretan, 1500-1400 B.C.

This painting of one clay upon another was done with a brush made by shredding the fibers of a dried plant. Bits of the natural clay were pulverized, mixed with water to a creamy consistency, then applied to the jar. The same type of decoration has continued through the centuries, and, in the modern world, has resulted in some of the most beautiful and highly prized of ceramic work. In today's trade, this method of decoration is known as slip-painting or engobe work. After the slip has been applied to the leather-dry clay, the piece is set aside to dry thoroughly, after which it is ready for the firing process.

The primitive kiln was nothing more than a hole in the ground filled with wood, dried leaves, grass, bark, and bits of broken pottery. After the finished piece had become thoroughly sun-baked, it was placed in the hole, covered inside and out with all sorts of debris, and allowed to bake for a week or more. After being in the kiln for this period, it was suffi-



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Fig. 91

Fig. 92

Fig. 91, San Ildefonso Indian Pueblo, New Mexico. After the base is shaped, Marie forms the wet clay into long ropes and builds the pot rapidly to the desired height. Fig. 92, San Ildefonso Indian Pueblo, New Mexico. While Marie is famous for her black pottery (see in the foreground), she also makes highly decorative pieces such as that which she is holding.

ciently baked. It was then removed and set aside to cool slowly to prevent breakage.

In this primitive method of pottery making, one sees the beginnings of a great craft that was born of strict necessity. All modern hand-built pottery follows in the main the same method devised so long ago by the ancient men of the craft. Not only their way of building but, also, their methods of decoration are today accepted as the most logical, fully in keeping with the character of the plastic material and the surface to be decorated. Figs. 91 and 92.

THE COILED METHOD

Before beginning to experiment in building a pottery form, make a few observations with reference to shapes or forms in general. There are a few simple points that, if not observed, mean time and material spent in futile effort; whereas, in keeping these in mind, the result may prove satisfactory, and, indeed, it is quite possible that a beautiful piece of work may be achieved.

The following points are worthy of consideration in planning any pottery form:

(1) Consider the proportion of height and width. Forms are more pleasing when this is not too evident; for instance, the height exactly twice the width, or three times the width. One and one half the width or one and two thirds the width would be more subtle and more satisfactory—a ratio of 2:3 or 3:5.

(2) Decide where the greatest curvature should come. This should not divide the form half and half. Fig. 93. Compare A, B, and C.

(3) The contour or curve of a form is more pleasing when the curvature changes throughout the form. Fig. 93. Compare A, B, and C.

(4) It makes for a more interesting form if the ellipse of the top and that of the base are not of the same size. Fig. 94. Compare A, B, C, and D.

(5) Avoid sharp angles. The same general form when changed into a subtle curve is more pleasing, and in keeping with the plastic material. See p. 135, Fig. 105.

Fine examples of Indian pottery, also modern pieces of pleasing form, are worthy of thoughtful observation when contemplating such a project.

Before beginning work in the clay, one should have a clear and definite idea of the form that he plans to build. After experimenting with several sketches, decide on one and draw it full size. If one half the form is drawn, the paper may be

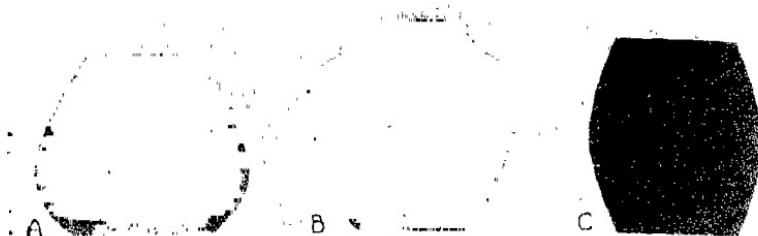


Fig. 93

folded on the center line and the full form cut out, giving the complete pattern. In cutting out the pattern, the part cut away, which gives the contour, should be saved. If, with this as a pattern, another is cut from rather stiff cardboard, it may be used as a guide by holding it against the form and testing the contour of the built piece. Such a guide is called a template and is very useful for this purpose.

In building upon a plaster bat, place the bat in water, keeping it there until it has absorbed all the water it can take. This will prevent it from taking moisture from the clay. Suppose a bowl with a base of about 3 or 4 inches in diameter is planned. With a bat of about the same size, a moist cloth at hand, and a batch of clay, one is ready to begin. Start building the base with small pieces of clay well worked together. The base must be thoroughly wedged and built to a thickness, generally, of $\frac{1}{2}$ inch. Fig. 95A. This, of course, depends upon the size of the piece. A very large jar would need a very much thicker base, while a very small vase may need a base much thinner. The base, however, thick or thin, should be well built. It is difficult to patch up careless work after the coils have been started.

The base, having been well made, is now ready for the first coil. Fig. 95A. These coils are made by rolling out the clay, not with the palms of the hands, but using the fingers of each

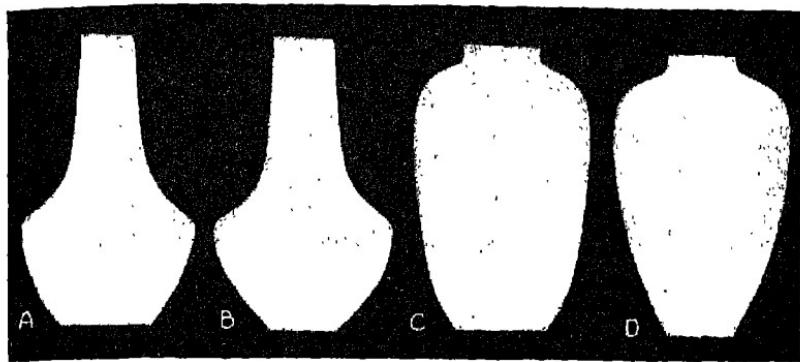


Fig. 94

hand. With the outward movement of the hands in rolling, the fingers are spread apart, and the clay is thus naturally drawn out. The coils should, as a rule, be close to $\frac{1}{2}$ inch in thickness. The size of the form, however, must determine the thickness of the coil. If coils are too heavy, the piece looks crude; if too thin, the wall sags, loses its form, often breaks, and cannot be completed with any degree of satisfaction.

After the clay has been rolled out, one end of the first coil is fastened to the outer edge of the base and coiled upon it. The form may be built one coil at a time, which probably would circle the base two or three times. Coils should then be worked together and smoothed both inside and out. In smoothing, one hand should be on the outside of the form while working inside, thus keeping the inside pressure from destroying the contour; when working outside, the walls should be carefully braced from the inside. As one develops more skill, the walls may be built up spirally, several coils being added before the smoothing is done. Fig. 95B. Further, before the successive coils are added, the preceding coil may be flattened a trifle, thus making the surface better fitted to receive the next coil. If the clay should become somewhat dry in working, covering it with a wet cloth will keep it in condition. Sometimes it is an advantage to have a bowl of slip at

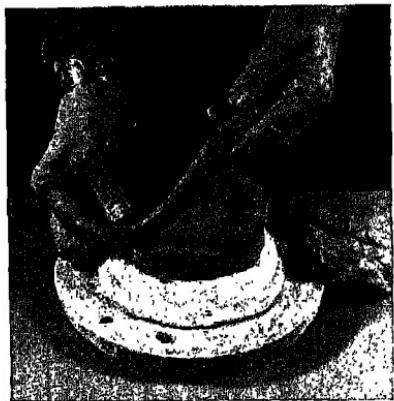


Fig. 95A. The base has been modeled in solid form, the first coil is set in place, securely wedged to the base, and the coiling process begins.



Fig. 95B. Continuing the coil, keeping as near to the planned shape as possible.

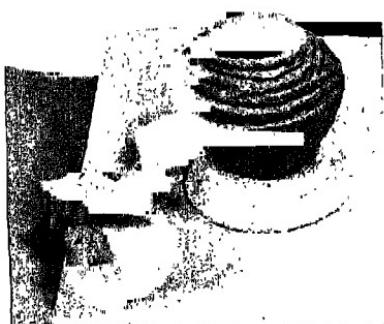


Fig. 95C. The lower part of the bowl has been smoothed both inside and out, while the upper coils are in place but not yet smoothed.



Fig. 95D. Completing the form and testing it with a template.

hand and use this between coils, thus helping to make the wedging more secure.

The bowl, if on a bat, may be easily turned about and the curvature studied from all sides. This is one advantage in using

a plaster bat. If the template is used in the building, the finishing will not be difficult. If the walls seem too thick, some of the clay may be removed with the wire tool. If any irregularities appear upon the surface, these also may be remedied; or, if any depressions appear, these may be built up by adding bits of clay. If, however, a little unevenness does appear, this is not serious or to be regretted too much, for a hand-built piece is not supposed to have the mechanical perfection of a wheel-made or cast piece. It should have the subtle marks of being hand-built. Fig. 95D.

Next, the top is leveled and the edges rounded and smoothed. Use a damp cloth to moisten the fingers for this process. The entire piece should now be smoothed and finally passed over with a damp sponge. After the clay has been allowed to stiffen a bit, it is removed from the bat, turned upside down, and the base then finished. All superfluous clay is removed with the wire tool. A slightly concave effect may be given the base by pressing lightly with the thumb slightly inward upon the center and gradually rounding outward toward the outside edge. Under no circumstances should the form be allowed to harden before it is well finished. When completed, it is set aside to dry thoroughly before being submitted to the kiln.

If zinc, tin, or plaster-lined boxes are not available, the unfinished pieces may be kept in good condition by covering them with a damp cloth and then adding another, or a second covering of oilcloth.

Such is the simple procedure for all hand-coiled pottery. If handles or spouts are to be added, they are made separately and attached. These should harmonize in line with the form and appear to be a structural part of it. The place where the handle or spout is attached should be roughened and this and the ends of the handle or edges of the spout covered with slip and a little wet clay, then wedged firmly into the main form. The same practice holds for all attached parts or modeled

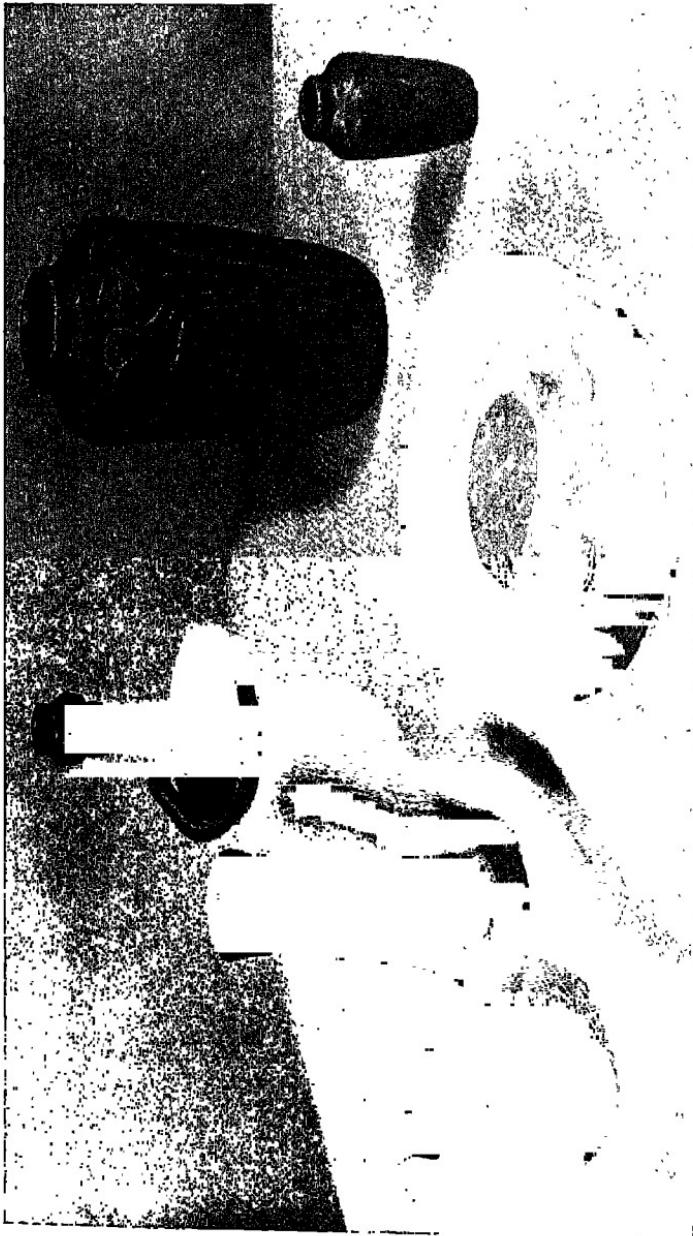


Fig. 96. Original designs in coiled pottery forms; matt glazes, silver green, dark green, and black.

decoration—that is, roughen the clay, spread with slip and a little wet clay, then wedge firmly into the form.

DECORATION

Many forms are beautiful in themselves and decoration is superfluous. However, if decoration is to be added, such should be in conventionalized designs or abstract patterns. There are several decorative processes for the application of such designs to pottery and, surprising as it may be, the most natural processes were originally fashioned by the primitive workers in clay. The old-time incised line is still one of the best of these, chiefly because it is unobtrusive and yet may add a note of distinction. Other possibilities (see Chapter Six), some more desirable than others, are relief, slip-painting, underglaze and overglaze decoration, sgraffito decoration, and pierced design.

A few observations with reference to a particular piece may be well to consider before planning the pattern:

(1) Does the form admit of decoration? If handles have been added to a form, this, in itself, may be sufficient decoration and anything further may lead to overdecoration.

(2) Will the design be well spaced? A border should be so placed that the space which it occupies and the surface left undecorated give a pleasing variety in the spacing. The same must be considered in adapting any design to a surface.

(3) Where is the point of greatest curvature? Any decoration at this point tends to overemphasize the curve. The point of greatest curvature should remain undecorated.

The incised line is the simplest form of decoration and, the nature of the material being considered, is, indeed, a logical one. Every design should be definitely planned before placing it on the clay form. If the design is to be incised, the form may be divided into halves, fourths, etc., as is best suited to the pattern, and the unit placed in each space. The unit, definitely planned, may be transferred to the clay; or, if the



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Fig. 97



Fig. 98

Fig. 97. "Marion's Pie Plate." Decoration, "four and twenty blackbirds." Plate, red clay. The design in white slip is drawn freely with a brush, a technique related to that of early Connecticut ware. Fig. 98. Slip-tracer. Slip-tracing was a method of decoration popular with the early Pennsylvania-German potters. Pressure upon the rubber cup forces the slip through the tube. Much of the early work was done in freehand style.

paper is sufficiently thin, it may be traced with a pointed tool or pencil. When the design has been carefully indicated on the clay, a pointed tool may be used for incising the line. The edges of the line are then rounded back into the surface, as directed, thus giving the glaze the opportunity to flow evenly into the grooves. See full directions for incised decoration, p. 80, *The Incised Tile*.

When the decoration is in very low relief, the design may be transferred to the clay, then the tool may outline the pattern and round back the roughened edges into the background. If one wishes, the pattern, or parts of it, may be built up directly on the form. If small units of design are planned in either high or low relief, they may be modeled separately, then, with the aid of slip and moist clay, attached to the form

in the same manner as are handles and spouts. This method, adding units in relief, is known as embossed decoration. Relief decoration on a pottery form is, however, the least satisfying of the various processes.

Another ancient source of decoration is the use of natural or artificially colored clays for painting designs upon the moist clay form. This is the old-time slip-painting, adapted to modern use. Fig. 97. See full directions for slip-painting, p. 88, A Tile in Slip Decoration.

While on the subject of slip and slip decoration, one may consider the art of slip-tracing. This process of decoration is accomplished by means of a little tool known as a "slip-tracer." It is a small rubber cup with a tube attached through which, by pressure on the sides, the creamy slip is forced out. The method of working resembles the way ornate frosting is added to the birthday cake. Fig. 98. An inexpensive cake decorator or a small syringe may be used for this purpose. The early Pennsylvania Germans used an earthenware cup with a quill inserted, through which the slip flowed freely without pressure. Often two or three quills were inserted, usually in a row. The designer could then make several rows with one passage of the tracer. The design is gradually raised by tracing the line of the pattern with the slip as it flows from the tube. The pattern may be traced several times if much relief is wanted; or, if one has a feeling for design, he may enjoy "frosting the cake" in freehand fashion, and always on leather-dry clay.

Tracers were used especially for lettering and writing on clay dishes and tablets, and for the outlining of figures.

A third possibility in decoration is the use of underglaze colors. Such colors are usually painted on the biscuit ware. The piece is then submitted to the fire and, after this, given an all-over clear, transparent glaze and fired a third time. A transparent glaze over an underglaze gives a brilliance to the color that can be secured in no other way. See full directions

for underglaze decoration, p. 91, A Tile in Underglaze Decoration.

In overglaze decoration, the design is painted with special overglaze colors directly upon a glazed surface, hence "overglaze" decoration. Submitted to the fire, the overglaze colors mature at a lower heat than did the body glaze. Full directions for this process, p. 93, A Tile in Overglaze Decoration.

The popular sgraffito method, sometimes called "slip engraved," is still another source of decoration, and one which has brought lasting fame to the early potters of Pennsylvania. Fig. 99. As a rule, the designs of these early potters were drawn off-hand on the white slip coating which covered the darker body. The white slip was then scratched away, leaving the darker body color, the design, in definite contrast to the white coating. Fig. 100. One must be extremely careful in such freehand decoration, for one false scratch may severely affect the appearance of the design. It is much safer to plan the pattern on paper and then sketch or trace it on the white slip coating. Then one works with more assurance in securing a well-executed pattern. See full directions for sgraffito decoration, p. 94, A Tile in Sgraffito Decoration.

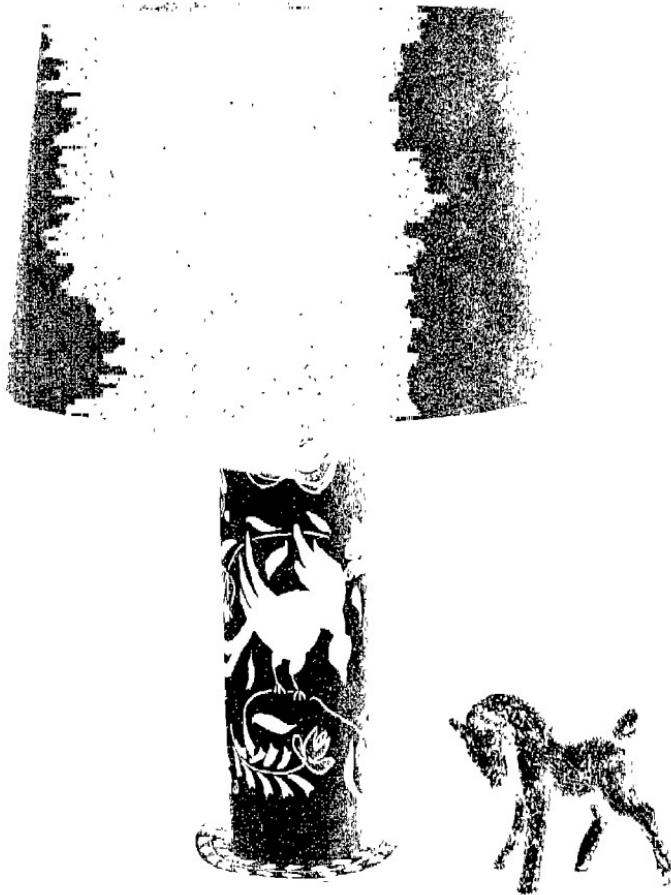
Pierced decoration is applicable to such pieces as fruit bowls, lamp bases, and other forms not intended to hold water. The Chinese in particular developed this technique in their fine porcelains and later, during the eighteenth century, the style was revived by certain French potteries. Sometimes such pieces were planned with a second piece, which was water resistant, and fitted inside the outer pierced wall. Such pieces are very attractive when well designed and executed. Fig. 101. See full directions for developing pierced designs, p. 97, A Tile in Pierced Design.

With so many interesting possibilities in the decoration of pottery forms, each of which produces different effects and in great variety, there remains for the designer only the mere matter of making a choice.

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Fig. 99. The familiar tulip, love birds, and flower motifs of the old Pennsylvania-German potters were used in creating these authentic reproductions. White slip covers the red clay and is scratched away to show the design in the red underbody. Colored engobe is also applied to the design. Red, blue, green, yellow, and black predominate. The pieces were then fired to the bisque. After the bisque firing, a transparent glaze was applied and the pieces fired again to produce the results as seen above.





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Fig. 100. The finely proportioned pottery lamp employs to excellent advantage the tulip-and-peacock designs of the Pennsylvania Dutch. The prancing colt is finished in white crackle glaze, which gives a noticeably pleasing effect.

SLAB-BUILT POTTERY

A second kind of pottery building is that made with slabs of clay, about $\frac{1}{4}$ inch in thickness. This method takes care of

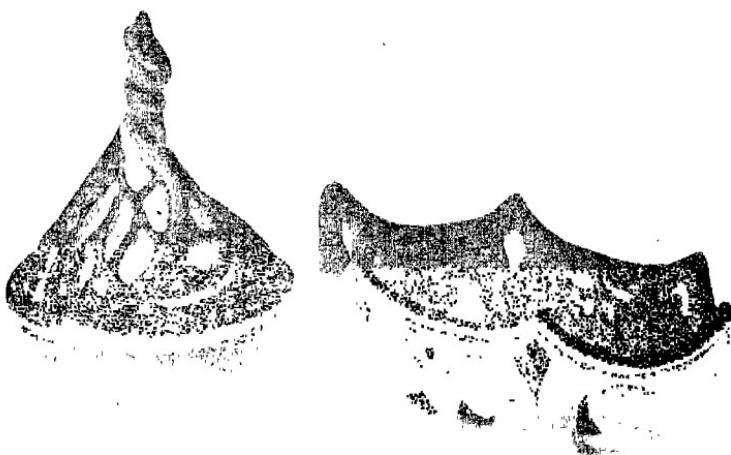


Fig. 101. Pierced decoration. Incense burner and fruit dish.

forms planned with flat sides and more-or-less angular corners. Many useful pieces are made by this method, which has become popular for such objects as boxes, lamp bases, plant boxes, hanging baskets, ash trays, and six-sided bowls and jars.

The first step in making a slab piece is to make a drawing or layout of the project. Fig. 102 shows the plan of a box, after the various pieces of the pattern have been cut and placed on the clay. The clay is then cut according to the pattern. This plan also considers the cover for the box which may be of the same size as the base, or from three sixteenths to one fourth larger on all sides.

The clay should be in good condition, not wet, but moist-dry and easy to handle. It is advisable to cover the drawing

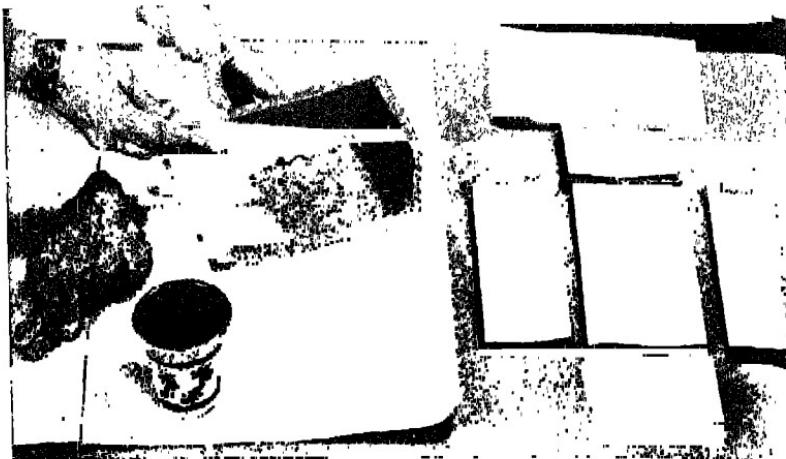


Fig. 102. Placing the wall in position and securing it on the inside with slip. Right, plan of the box, each piccc laid out.

board with a piece of cotton cloth or oilcloth, with the underside up, to prevent sticking. This should be secured by thumbtacks. With this cotton cloth or oilcloth tacked tight on the board, prepare the clay for making the slab. First, knead the clay to rid it of air bubbles. Then lay it on the board and begin to flatten it out. When it is fairly well spread out, a rolling pin may be used to further the preparation. When rolling the clay, roll first forward, then sideways, and keep on in this way until the clay is about $\frac{1}{4}$ inch in thickness. Sometimes it is advisable to roll from the center in all directions until the clay becomes the proper thickness. If rolled continuously in one direction, this leaves a kind of wave or roll in the clay, which, if not corrected, never disappears.

With the drawing at hand and the clay rolled out to the proper thickness, the next step is to cut the several clay slabs which go into the making of the box. If the clay slab is large enough, the whole drawing may be placed on the slab and the lines traced on the clay; or, which many prefer, the separate sections of the drawing are cut out on the line and each



Fig. 103



Fig. 104

Fig. 103. Filling the angular recess at the outside corner. Fig. 104. The completed box.

pattern laid on the clay slab. If several small slabs have been made, the patterns may be laid to best advantage. Then, with a knife, the pieces are cut out following the edge of the pattern. The knife should be held vertically and a straightedge used to keep the line perfectly straight. In cutting, carry the cut beyond the corners so as to make a clear-cut corner. The knife should move easily through the clay; if it drags at all, the clay is too wet, in which case it is better to set it aside to dry a little before proceeding.

The next step is to assemble the separate pieces. In joining all edges, a generous supply of slip is used, together with wet clay. The pieces to be joined should be roughened at the joint or checked, and the slip applied together with the wet clay.

Assuming that one is ready to assemble the sections of a box, first place the bottom of the box on the drawing board and set an end segment against it. Some prefer to set the segment on the base. This, however, is optional. Roughen and add slip to both edges to be joined. Fig. 102. Press in place. Then, taking a small roll of moist clay, press this into the joint on the inside, giving a rounded surface to the clay. Now

place the side segment in position and make the joining at the base first. Where the two upright segments meet, there appears an open corner or angular recess on the outside. Fig. 103. Roughen these surfaces and fill in with slip and a roll of clay. This gives a claylike, plastic corner, and accordingly softens the mechanical effect which is so likely to creep into square-cornered boxes. Of course, the design in these filled-in corners is left to the designer. It is an opportunity for an interesting variety of possible handlings and may add to the general design of the box. Fig. 104.

Continue adding the segments with the slip and wet clay and the roll of clay at the base. Fill in the open corners with the roll of clay. When the box is finally completed to one's satisfaction, it may be set aside while the cover is considered.

Covers are planned in various ways. If the piece should be a jar with a small opening, the cover usually fits over the opening. In a fairly large box, the cover is sometimes made to lie flat on the box and, to keep it in place and secure from sliding, little knobs are added at each corner just inside the cover. These fit into the box when the lid is adjusted and it will not slide off. One may, if he prefers, run a little recess along the inside wall of the box in which the cover may rest. Still another method is to fit a flat slab about $\frac{1}{8}$ inch in thickness on the inside of the cover, leaving a narrow margin around it. This margin rests on the top of the four walls of the box when the lid is in place. The difficulty which arises in the fit of lids is due to shrinkage. If covers are made a trifle large, after they are sufficiently dry, they may be rubbed down to an acceptable size.

After completing the building of a slab piece, decoration is considered. This may be an incised line, which is always attractive, underglaze or overglaze painting, slip decoration, or the attractive sgraffito work. Fig. 99. For a detailed description of the methods used in each of the above processes, see Chapter Six.

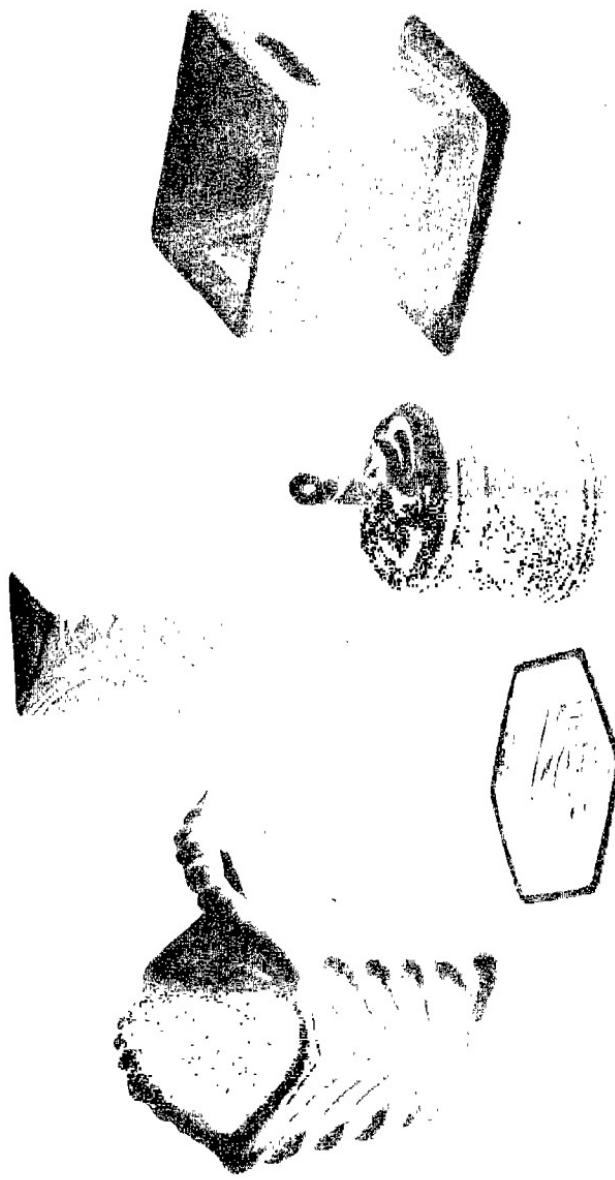


Fig. 105. Slab-built pottery. Red slip-painted designs on buff clay, completed with an overall transparent gloss glaze. Note rounded corners.

Bibliography

- Barber, Edwin A., (a) *Pottery and Porcelain in the United States*; (b) *Tulip Ware of the Pennsylvania Germans*: The Pennsylvania Museum and School of Industrial Arts, Philadelphia, Pa.
- Binns, Charles E., *The Potter's Craft*: The Van Nostrand Company, New York, New York.
- Cox, Warren E., *Pottery and Porcelain* (Vols. I and II): Crown Publishers, New York, New York, 1944.
- De Sager, W. A., *Making Pottery*: The Studio Publications, New York, New York.
- Dougherty, John Wolfe, *Pottery Made Easy*: Bruce Publishing Company, Milwaukee, Wis., 1939.
- Forsyth, Gordon M., *Art and Craft of the Potter*: Chapman and Hall, Ltd., 1934.
- Lunn, Dora, *Pottery in the Making*: Dryad Press, London, Manual Arts Press, Monroe and Fayette Streets, Peoria, Illinois,
- Wren, Henry and Denise, *Handicraft Pottery*: Sir Isaac Pitman & Sons, Parker Street, Kingsway W. C. 2, London.
- York, Honore, *Pottery Making (From the ground up)*: The Viking Press, New York, New York, 1941.
- Svec, J. J., *Pottery Production Processes*: Industrial Corporations, Inc., 59 E. Van Buren St., Chicago 5, Illinois, 1946.
- MAGAZINES
Ceramic Age (has special department, "Art Ware and Pottery Section," of interest to craftworkers and students): 421 Parker Street, Newark 4, N. J.
Ceramic Industry (containing many interesting news items of modern craft workers and their products): Industrial Publications, Inc., 59 East Van Buren Street, Chicago 5, Illinois.

Chapter Nine

THE POTTER'S WHEEL

Building pottery on a potter's wheel is one of the most fascinating experiences of the potter's craft. Fascinating, because the plastic clay is so completely responsive to the slightest touch. Unless one is well-practiced, the results are often disappointing, if not ludicrous. On the other hand, as one gains control not only of the wheel but the use of his hands as well, it is indeed inspiring to see a batch of ordinary clay transformed into a beautiful jar, bowl, or vase.

Records show that as long ago as 4000 b.c. the Egyptians had worked out a simple potter's wheel. This was a small table revolving on a pivot. The hand gave the table a push and, as it revolved, the potter shaped the form. As the table slowed down, it was given another spin, and, no doubt, many more were necessary before the piece was completed. Later in



FROM "MANNERS AND CUSTOMS OF ANCIENT EGYPTIANS," WILKINSON

Fig. 106. Egyptians making pottery on a wheel. From a tomb wall-painting at Beni-Hassan. (1) The inside and lip of a cup are formed as it turns on the wheel. (2) Potter forms the outside of a cup, indenting it at the base with his hand preparatory to removing it. (3) The cup is removed from the clay mound. (4) A fresh piece of clay is placed on the wheel. The small forms about the figures represent the pieces already made.

Egyptian history, about the time of the Ptolemies, 343-23 b.c., an improvement was made on the old wheel. A large circular table was now placed lower down on the central axis. The ancient potter propelled this with his foot. On the top of this central axis, which was flat and about 8 or 10 inches in diameter, he built the clay form. With the new wheel, the hands never left the clay while the foot kept the wheel revolving.

All the later potter's wheels have been built on practically the same general principle. These have become known as "kick wheels." With the coming of electric power, however, it was not long before the old-time kick wheel, with the laborious effort necessary to keep it going, gave place to the modern electrically driven wheel, with its greater ease in operating. Yet some of the old wheels are still in use. Many potters like them and are practiced in the art of "throwing." For those who have attained skill on the electric wheel, however, there is no going back to the old.

The ease and rapidity with which forms can be shaped on the electric wheel, the regularity of shape, the refinement and perfection of finish, make it an interesting and inspiring development of the pottery craft.

What is known as throwing, or building on the wheel, is not easy to learn, especially in the sense that it can be immediately accomplished. One attains skill gradually. It would be well for a beginner to watch an experienced potter build a form on the wheel, see how he raises the inert mass, then lowers it, brings it up into a cone, lowers it into a mound, hollows it out, and finally shapes it into the form he has in mind. In fact, he seems to delight in playing with the very responsive clay, making it do all manner of things until he is ready to set seriously to work. Of course, all this raising, lowering, and playing with the clay actually helps to bring the mass into better and better condition for the final shaping.

In beginning work on the wheel, one should have at hand

a bowl of thin slip, a moistened sponge, and a few tools—a knife, a piece of wire from 10 to 15 inches in length, and possibly two or three flexible tools which may be of use as one gains skill in throwing and completing his work on the wheel.

For the beginner, the following steps in controlling the clay and completing a form may be of assistance:

THROWING AND CENTERING THE CLAY

First, the wheel should be started, the right side moving away from the worker. Wet the wheel with the slip; then wipe it off. Taking a ball of clay about the size of a baseball, throw it straight to the center of the wheel. It is most important that the clay be accurately centered on the wheel bat or plate.



Fig. 107. Throwing and centering the clay.

With the hands moistened with slip, rub over the clay. This makes the clay run more smoothly and eases the friction. Cup the hands firmly over the moist clay. Fig. 107. The hands should be held rigid and the elbows braced against the sides of the body as the next movement begins.

RAISING THE CLAY MASS

The turning of the wheel causes the clay to rise naturally in the shape of a cone. Fig. 108. Let the hands rise with the clay, and do not try to force or draw up the clay mass. The hands should not move or turn with the clay, but be held rigid. Now, as the wheel revolves, press the clay down again into a mound. To do this, hold the thumbs together over the top



Fig. 108. Spinning up the cone.

and with the palms—and especially the base of the thumb—press firmly down. Again spin the clay up into a cone shape, and again bring it down. Such practice is very helpful in gaining control of the clay and may be repeated many times.

OPENING UP THE MASS AND RAISING THE CYLINDER

With the hands steadyng the clay and the forearms braced against the sides of the body, bring the cone down into a low mound, preparatory to opening up the mass. Be sure that the clay is exactly centred. To prove this, bring the right forefinger, steadied at the wrist, closer and closer to the clay until it all but touches. If the clay contacts the finger at any point it is not centered, and the operation of raising and lowering the clay must be repeated. Now, with the clay in the form of a domed mass and the hands cupped over it, press the tips of the thumbs into it, marking the center. This is only the beginning of opening up the mass. Again, the hands moistened with slip cover the clay while, as the wheel revolves, the thumbs sink deeper and deeper into the mass until within about $\frac{1}{2}$ inch of the base. The feeling about how far to go and still have sufficient base to trim and finish is something that comes with experience. If one is doubtful, he may experiment with a stiff wire to get the remaining thickness of the base. The slight opening or hole will close again before the form is completed.

Now that the mass is opened, the next step is to begin hollowing out the form. Cup the hands, wet with slip, over the outer surface, with the thumb of one hand pressing deep into the center of the clay mass while the other hand supports the outside wall. As the wheel revolves, slowly but firmly pull the thumb from the center toward the outside wall. In this way, the clay mass is opened and the form gradually hollowed out. Fig. 109.

Next, with the fingers of the left hand inside the form, the

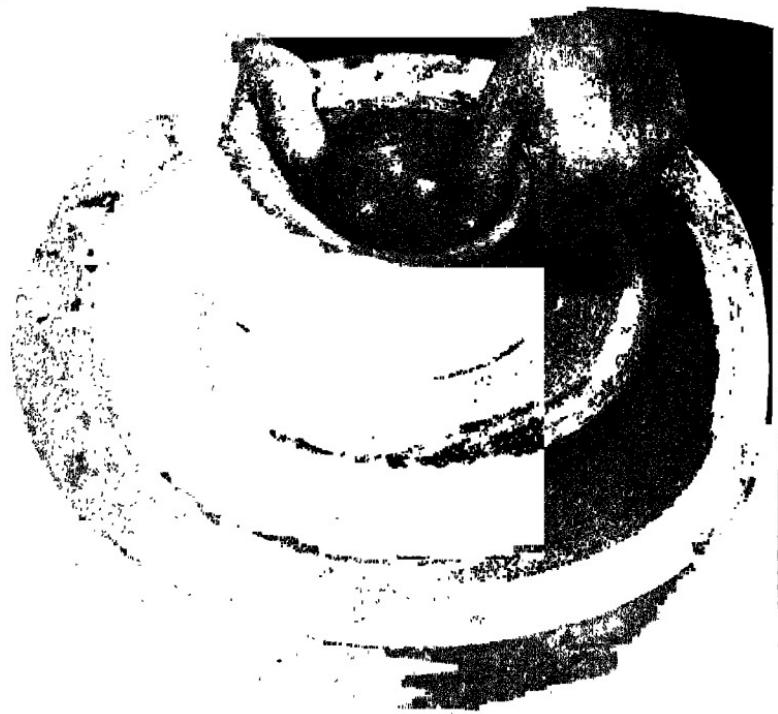


Fig. 109. Opening up the mass and hollowing out the form.

forefinger against the wall, the thumb outside, and the supporting forefinger and thumb of the right hand as in Fig. 110, slowly as the wheel revolves, raise both hands. This movement of the clay between the forefinger inside, the thumb outside, and the supporting finger and thumb of the other hand, causes the clay to rise, and it begins to take the form of a low cylinder. With the hands in the same position, the walls may be carried higher if so desired.

After the cylinder is formed and before raising the wall and making it of equal thickness, it is advisable to level the inner surface of the base and clearly define the line where the side walls begin to rise. If the form is low, this may be done



Fig. 110. Beginning to raise the walls of a cylinder.

with the finger or a tool with flattened end held against the base as it turns; if the form is high, a stick with squared end held firmly against the bottom surface will accomplish the same purpose.

With the inside surface of the bottom level and squared, begin raising and thinning the wall. With the hands slightly moistened with slip, place the left hand inside the cylinder with the second joint of the forefinger against the inside wall at the base. Place the knuckle of the right forefinger against the outside wall opposite, and a little below the finger inside. As the wheel revolves, gradually raise the finger inside and at the same time the knuckle on the outside, in this way raising and at the same time thinning the wall. Continue gradually

raising the wall in this way to the height planned. In so doing, aim to keep the wall of equal thickness. If the first efforts are not successful and the wall is not of equal thickness, one may repeat the process, pressing hardest where pressure is needed and going lightly where the wall is satisfactory. This process used in raising and shaping a wall is known in the potter's language as "knuckling up." In Fig. 111, the wall of a low cylinder was first made of equal thickness by this method, and is now being shaped by the same process. During the shaping, the wall may become still thinner.

SHAPING THE WALL

After securing an even thickness in a wall, it is ready to



Fig. 111. Shaping the walls of a low cylinder by the "knuckling-up" process.
[144]



Fig. 112. Shaping the thinned walls of a tall cylinder.

be shaped according to the planned design. If the top of the cylinder is not level, it is best to even it before proceeding with the shaping. To do this, a sharp tool, usually a knife, is used. This is held in the right hand supported at wrist with the left. Gradually the knife is brought closer and closer to the top until it touches. If the opening is not level, the knife will trim off the surplus clay, which should be removed immediately.

With the top level, one proceeds with the shaping, which is controlled by the fingers of the two hands working in unison, following the knuckling-up process. With the second joint of the left forefinger deep inside the form and the

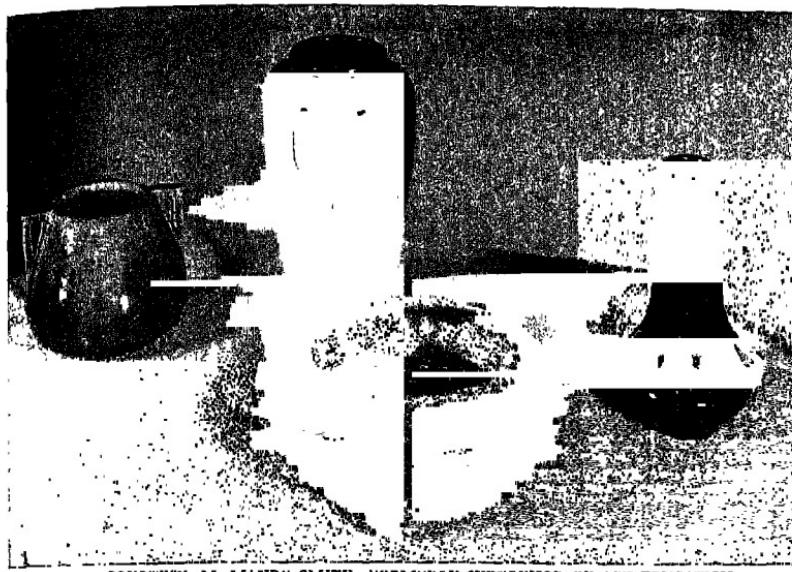
knuckle opposite and a little below on the outside, beginning at the base gently force the wall either inward or outward as the pattern indicates. When the curve is inward, press the clay inward with the knuckle; when outward, press the finger inside outward, shaping as one proceeds upward and constantly controlling the form in this way. Figs. 111 and 112. In Fig. 112, as the wide flange of the top forms, the clay is controlled by the fingers of the left hand inside as shown. Continuing the pressure and careful shaping of the clay in this way, the walls are gradually brought to conform to the planned pattern.

FINISHING

First, see that the inside of the form is free of all bits of loose clay. As the wheel revolves, smooth the inside with a moist sponge, holding it firmly against the surface. Then smooth the outside in the same way. See that the top is level.



Fig. 113. Finishing the lip rim.



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Fig. 114. Wheel-made pottery. The low bowl is a thrown piece with feet added. Matt glaze. The tall pieces were originally "thrown"; handles, in keeping with the form, were then added to the two smaller vases, molds made, and the three forms slip-poured. Gloss glazes.

Next, the lip is finished. Starting the wheel and with the thumb and forefinger of the right hand moistened with slip, they are held apart, the thumb on the inside, the forefinger on the outside down to the curve between the two. As the wheel turns, the curve between the two rounds the edge of the rim. Some craftsmen use the forefinger and middle finger in the same way. After the general rounding of the lip, any slight change in the thickness or thinness of the lip rim may be made by holding the right forefinger and thumb, supported by the left forefinger, against the edge as the wheel turns. Fig. 113.

FINISHING THE BASE

Before removing a piece from the wheel to finish the base, it should dry for at least two hours. When ready to be re-

moved, a wire is used to cut it loose from the wheel. With one end of the wire in each hand, held taut, cut from front to back close to the wheel head. Then, with both hands, carefully remove the clay form. The piece must now be set aside to dry for about twenty-four hours.

In finishing the base, the piece is turned top down, base up, and centered on the wheel. With a sharp tool held in the right hand, supported at the wrist by the left, and the wheel revolving, a circle is made around the base about $\frac{1}{2}$ inch in from the edge, the clay slightly depressed, then smoothed, and the individual's mark added. Next, using both hands, the piece is carefully removed and set aside to dry, preferably on a plaster bat. After the piece has become bone-dry—that is, all moisture has been expelled—it is ready for the biscuit firing.

It must be added that this skill in using the potter's wheel is not gained in a day. It takes both patience and experience to become expert on the wheel. As one works, he learns many little skills for shaping and controlling the clay, for making the two hands work together, one supporting the other, and begins to understand the importance of getting the right grip on both the inside and outside of the clay form. It is only by observation of these points and by continued practice that one becomes expert in the general craftsmanship of wheel-built pottery.

Chapter Ten

GLAZING

Pottery that is baked only is always porous, and hence not water resistant. For this reason a vitreous coating is necessary. It is believed that in the early days of pottery making, the idea of using a vitreous coating, or glaze, came through accident. Soft pottery when overfired develops a kind of semigloss and it is possible and, indeed, highly probable, that some such accident as this may have suggested the idea of glaze.

The ancient Egyptians were probably the first to beautify their clay objects with glaze. They applied glaze to beads, scarabs, and other amulets, also the various little figures which, in later years, have been taken from the tombs. These have been found covered with a blue glaze. In Persia, the blue glazes used by this ancient people are unsurpassed in their brilliance and beauty. The Chinese in the third century B.C. had learned how to produce green-glazed earthenware. The Greeks, whose pottery is known for its beauty of line and decoration, did not use glaze. Their figures were drawn and painted on the ware. Glaze could not be controlled for this type of decoration. About 1500, the potters of Italy covered their reddish clay pieces with a creamy slip, to which tin had been added to make it white and opaque. They then decorated the surface with bright colors. This ware became famous as "majolica," named from the Island of Majorca, whence the method had originally come. During the same century, Lucca

della Robbia, the renowned Florentine sculptor, introduced for the first time the use of colored glazes on reliefs in terra cotta. His family continued the practice for which the name "della Robbia" is famous.

In the olden days, potters made their own glazes and were limited in the range of color. In the modern world, the field of ceramics has widened. Today, glazes are prepared by technical experts, and in every desirable color, and these are available to all clay workers.¹ Though this is a great and welcome advantage to workers in clay, it still remains true that the greatest thrill comes in experimenting with one's own formulas and testing them out in the kiln.

All glazes are basically glass. They are prepared in such form as will cause the mixture to adhere to the clay body, and when submitted to intense heat are transformed into a glossy, transparent coating or a soft, opaque covering. In this way pottery is made impervious to moisture.

Glazes are supplied in powder form in both gloss and matt (opaque) and need only to be mixed with water to a liquid-flowing consistency for application to the "green" or biscuit ware. Full directions for the proportion of glaze to water are supplied with the material. After using any glaze, the hands should be washed. Particular care should be exercised in using glaze containing lead.

All ware to be glazed must be kept very clean and free from dust or grease; otherwise, the glaze will not adhere. This is an important point. Before the glaze is applied, the base of the piece should be given a thin coating of paraffin. When the piece is dipped into the glaze, the glaze frees itself from the paraffin. The base is then sponged. In the firing, the paraffin burns off, leaving the base smooth and clean.

Glaze is usually prepared in a deep, open bowl, pan, or other container and, when in large quantities, in tubs. It may

¹ Clays and glazes should be purchased from the same dealer to insure the glaze "fitting" the clay.

sometimes be applied to green clay, and always to biscuit, in four ways, namely: dipping, pouring, spraying, or brushing.

(1) Dipping is the method generally used for applying glaze to all flat and hollow ware. Small pieces of pottery are glazed both inside and out by this method. The piece is held at the upper edge by the forefinger and at the base by the thumb. It is immersed in the glaze, lifted, shaken a little to eliminate excess glaze, and set upside down on two parallel bars placed over the container. All glaze dropping off falls into the container. Any spot where the piece may have been held is touched up with the finger dipped in glaze, or with a brush. After sponging the base, the piece is left to dry.

Flat ware is taken from the glaze, the excess shaken off, the piece rotated in the hand to even up the glaze, the base sponged, and the piece set face up to dry. Avoid touching the ware until dry.

(2) When pouring the glaze over the outside of a piece, it is necessary to place the piece upside down over two parallel bars laid across the opening of the container. With a cup or saucepan filled with glaze, the liquid is poured over the base and allowed to run down the sides until fully covered. If the upper edge needs touching up, this may be done after the glaze is dry. Sponge off the base and let stand until dry. Then remove carefully.

(3) In spraying, a special sprayer is needed—also a wheel unless the worker can turn the piece as he sprays. The piece is set upon the wheel and, when ready, the wheel is started. The spray gun, when opened, should never be turned directly at the piece, but the full spray should be brought gradually into contact with the piece and, when the piece is completely sprayed, moved off in the same way. This prevents glaze from running and forming ridges. If a piece is preheated before spraying, the glaze dries immediately and thus assists greatly in securing an even coat over the piece. In case no wheel is at hand, the piece may be set upon a table and sprayed, then moved and sprayed

again until it is satisfactory. Avoid handling a piece until dry.

(4) In brushing, a small, flat brush is used. This is dipped into the glaze and applied to the clay in broad, even strokes. An effort should be made to direct the strokes in the same general direction. Avoid going over the glaze-painted surface.

All pottery pieces need a glaze on the inside. Small pieces, in the process of dipping, are coated both inside and out. With larger pieces, the inside glaze is always poured. Fill the ware about half full with the liquid glaze. Tilt and turn the piece until the inside surface is thoroughly coated; then pour the remainder into the container and set the ware aside to dry. This should be done before coating the outside with glaze.

Nearly all glazes mature around 1900° to 1940° Fahrenheit, and clays may be secured that mature at a corresponding temperature. The dealers in pottery supplies provide the necessary information with reference to the maturing point of the various clays and glazes, thus practically insuring successful use of them.

Chapter Eleven

FIRING

P

ottery is of little or no practical value until it is fired. The primitive peoples early discovered this and set about to find a way to make their clay pots and jars durable. These early efforts are nowhere more interesting than in America.

At first pottery was used largely for storage purposes and for carrying food and water, taking the place of earlier vessels of stone and reed. Later the clay pots were used for cooking. They were first sun-baked, and later baked more thoroughly by placing them in a pit filled with burning bark and other fuel and covering them with the same. The pieces were usually prevented from touching by broken pieces of pottery set between them. All draughts were eliminated during the firing and, as the pieces cooled, this protected them from breaking. The ware was left in the pit until the fire hardened the clay and made it strong. It did not, however, cause a change in the mineral content of the clay, as do our modern kilns. Such is the nearest approach to a kiln found among primitive peoples.

In various American museums, especially in those of the West, one may see rude pots, smoke-stained and cracked, jars and bowls, all of great size, and all mute evidence of the skill and ingenuity of these early Americans.

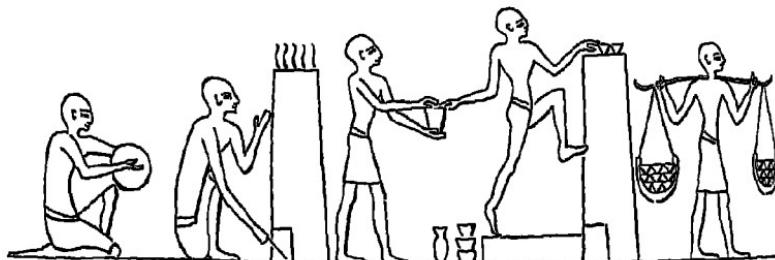
The Egyptians were probably the first people to use a kiln. A record in the form of an ancient mural shows a high chamber made of brick; the floor set up from the bottom was perforated,

and in the space under the floor was a small compartment for fuel, which was fed into the space through a small door at the side. Fig. 115.

The Greeks used a kiln similar to that of the Egyptians, except that the top was dome-shaped. The fuel chamber was at one side of the firing chamber. This had a door that could be opened to admit or withdraw pieces. Many of the large kilns of today are based on the general principles of the Greek kiln.

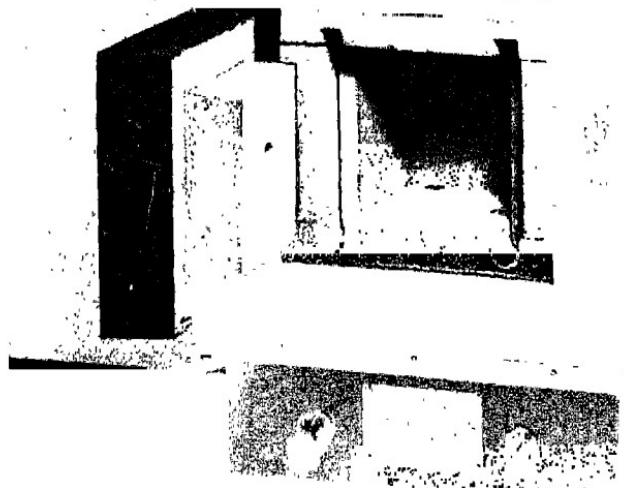
Today pottery may be fired in oil-burning, gas, or electric kilns. The sizes of the various firing chambers vary from the smallest used for firing miniature pieces, approximately $3\frac{1}{2} \times 3\frac{1}{2} \times 4$ inches, to those of much greater capacity. The smaller ones are largely for school, studio, and private use. Fig. 116. They are supplied by pottery dealers at very moderate prices and with full directions for stacking and firing.

The large commercial potters have extensive kilns, sometimes known as ovens. The ware is usually stacked, without touching, on a series of tables arranged as shelves, one above the other. With the touch of a button, the great tables with their precious load begin to move and pass into the first oven of low heat, and then on, moving through a series of increasing heats until they reach the last, by which time the glaze has



FROM "MANNERS AND CUSTOMS OF ANCIENT EGYPTIANS," WILKINSON

Fig. 115. Egyptians firing pottery. From tomb painting at Beni-Hassan. (1) Potter forms a round slab of clay with his two hands. (2) Preparing the oven, stirring the fire. Note fire rising through the long narrow tube or chimney, upon the top of which the cups are placed to bake. (3) One figure hands cups to the baker, who places them on the top of the oven. (4) Carrying away the baked cups, probably to the storehouse.



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Fig. 116. A modern, portable electric kiln, made in three sizes, operates on ordinary 110-V house current.

reached the maturing point. This usually takes about twenty-four hours. Then, at the proper moment, the same shelves loaded with the same ware gradually emerge carrying the finished merchandise. It seems like a bit of magic to see, first, the unfinished ware enter the kiln and then, after twenty-four hours of intense heat, to see the same ware quietly emerge bathed in the brilliance of colored glaze!

There are two stages in the firing of pottery—the biscuit firing and the glaze or “glost” firing. The biscuit firing is the first firing and is for the purpose of expelling all moisture and fusing the mineral content of the clay into a consolidated mass under the action of great heat. The biscuit-fired piece will not hold water; consequently, it becomes necessary to coat the

ware with a covering of glaze and submit it a second time to the intense heat. This is for the purpose of developing or maturing the glaze, which makes the biscuit ware nonporous. In the second firing the piece goes into the kiln with a coating of glaze, either transparent or matt (opaque) and, after the glaze has developed, it comes out either with a finish resembling a coating of glass or with an opaque finish. Transparent glazes are made opaque by the addition of oxide of tin.

Every clay has a maturing point, usually about or slightly above 1900° Fahrenheit. In order to determine when the maturing point is nearing or has been reached in the firing of either biscuit or glazed ware, pyrometric cones are placed inside the kiln. These cones are made of various mixtures of ceramic materials so that they will begin to bend at the time the ware or glaze is beginning to mature. Through the peephole in the kiln, one watches the cone and can judge the degree of heat by the extent to which the cone bends. When its tip touches the clay base in which it is imbedded, the ware or glaze has reached the maturing point. The heat is then turned off and the kiln left to cool gradually. Not until the kiln has completely cooled may it be opened and the pieces removed.

Today, with the great advances made in the firing of ceramic wares, especially in the large commercial potteries, the maturing point of clays and glazes is so well calculated that a piece of green clay, decorated with slip or underglaze colors and coated with a final transparent glaze, may be fired but once, and all three, the clay, the underglaze colors, and overglaze are developed in the one firing.

It is the firing of glazed pottery that is the greatest thrill to the clayworker. It is always with questioning anticipation that the kiln is opened, for one is never sure of results. Occasionally, to the potter's great joy, a single piece may be found upon which the fire has wrought a miracle and created one of those unusual and beautiful effects, produced, no one knows how, but by some unaccountable action of the heat on the glaze.

Chapter Twelve

MOLD MAKING AND CASTING

T

he pressing of clay within a gourd, basket, or other form to give it shape was probably one of the earliest discoveries which led to the making of molds. Primitive man, shaping the formless clay within some such object, placed it in the fire and, after a few days, found a shape like the original gourd or basket. The gourd or basket, however, had burned away, leaving this counterpart, useful for storing and carrying food.

Since that distant day, the making of molds has grown apace. Every worker in clay, whether modeling wall plaques, designing book ends, figurines, or pottery, likes to try his hand at making a mold and casting a replica of his original model.

Under the term "mold making," one will find that various kinds of molds are useful in clay work. The main types are: (1) Molds for slip casting; (2) molds for plaster casting; (3) press molds; (4) flexible molds; (5) waste molds.

Molds for slip casting are used for reproducing pottery forms and figures which are to be glazed and fired in a kiln.

Molds for plaster casting are used largely for the commercial reproduction of plaques, book ends, figures, and other objects which may be adapted to plaster. The casts from such molds are then given a suitable surface finish.

Press molds are similar to the slip and plaster molds. They are used chiefly because they provide a quick and inexpensive way to reproduce a clay model.

Flexible molds are made of treated rubber and other prepared and flexible materials. Such molds make it possible to reproduce models with difficult details, such as undercuts and returns, with greater satisfaction and less time than when making piece molds.

Waste molds are made in plaster and are chipped away as "waste" to release the model. Such molds are made when only one reproduction is planned.

In all mold making, plaster of Paris is in constant use. In the use of this material, if the work is to be carried on with any degree of order and success, it is most important strictly to observe the following "musts."

(1) Under no circumstances should bits of plaster, dry or liquid, or sediment which has been left standing in pans and bowls which have contained plaster, be permitted to go into a drain. This will clog a drain. Have a bucket or pan of warm water at hand and immediately wash one's hands and all spoons and pans used in mixing plaster before the plaster has hardened. Then see that the water is not allowed to go into a drain.

(2) Spread newspapers on floors and tables about the working quarters. These may be readily picked up afterward and will leave less trace of clay and plaster.

(3) If splashes of plaster appear on the clothes, these may be brushed off when dry.

(4) All plaster of Paris should be fresh and should be purchased as required. It should be kept in a warm, dry place, for plaster will absorb moisture and, as a consequence, is not satisfactory for use.

In the commercial production of pottery and other ceramic forms, the molds are usually made by experts. The model is cast in slip, or liquid clay, and when thoroughly dry (that is, bone-dry) glazed and fired. In preparing such molds for slip casting, as well as molds for plaster casting, there are two important mixtures that will be in constant use:

(1) Slip

Slip is a liquid clay of creamy consistency. It is prepared in quantity by sifting powdered clay into a container half filled with water. The clay will sink to the bottom, building up gradually to the surface. When it appears at the surface, enough clay has been added. This should stand for about an hour. Then sink the hand below the surface and stir vigorously. The resulting mixture is slip.

If the slip feels sticky, a little fine sand added and mixed thoroughly will help it. If it feels sandy, let it stand, thus giving any sediment time to settle, and then the clear slip may be poured into another container. It is good policy to run the slip through a 60- or 80-mesh sieve and let stand for about twelve hours. If water accumulates on the top, remove this before using. A little sal soda added to the water in making slip improves it for casting. Casting slip should weigh about twenty to twenty-four ounces to the pint.

(2) Size

When plaster is poured over any models made of plaster, wood, glazed and fired pottery, glass, or metal, the surfaces of such pieces must be sized to keep the plaster from adhering to the surface. Size makes a surface nonabsorbent. Size is never used on "green" clay, for it would soften the surface. Though various materials, such as linseed oil, shellac, grease, and slip, are often used as size, the following mixture is very simple to prepare and is thoroughly satisfactory. Since it can be reheated many times, it will be a ready means for performing several operations.

Size Mixture

1 quart water

1 large bar castile soap

$\frac{1}{4}$ pint melted paraffin

Shave the soap into the water. Set on a low flame until dis-

solved. Pour in the melted paraffin. Set aside to cool. When about the consistency of thin syrup, it is ready to use. Such a prepared solution is also known as a "separator."

Prepared separators are supplied by dealers in clay supplies. Other recommended separators are:

- (1) Equal parts of lard and tallow applied hot.
- (2) Two tablespoonfuls of soft soap to one pint of boiling water.
- (3) If the mold is clean and very dry, several coats of white shellac with a final coating of sweet oil over the surface before the plaster is poured.
- (4) Clay and water beaten to the consistency of cream; that is, slip.

Applying size: The following method in applying size is important:

- (1) Fill the brush and work over the surface.
- (2) Wipe with a damp sponge. This smooths the size mixture, which sometimes becomes spotted and uneven.
- (3) Apply a second coat and smooth as before.
- (4) Apply a third and fourth coat and smooth each.
- (5) The final coating should be smoothed with a soft cloth dipped in sweet oil, not in water. Sometimes the sweet oil is smoothed on with the finger.
- (6) Coatings should be repeated until the surface resists water.

MOLDS FOR SLIP CASTING

- (1) One-piece mold in which the model is such that the newly made cast may be easily lifted or "pulled" from the mold.
- (2) Two- and three-piece molds used for pottery forms which cannot be pulled from the mold.
- (3) Two-piece mold for figurine casting.

The One-Piece Mold

Have at hand a simple pottery form, preferably an open

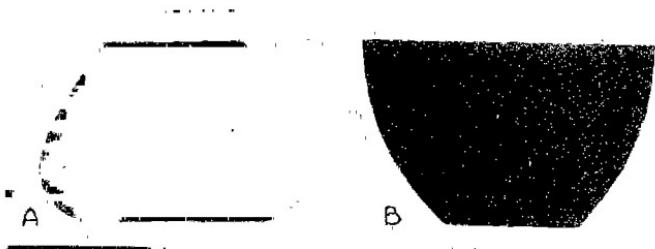


Fig. 117

bowl. Since models for one-piece molds must always conform to the rule—no undercuts, no returns which would keep it from being “pulled” from the mold—the form must be one that can be easily lifted from the mold.

It can be readily understood that a form such as Fig. 117A, growing wider toward the base, could not be drawn through the small top opening, whereas, B, with the wide opening and diminishing curve, is perfectly fitted to a one-piece mold.

In industry, such molds are turned solid in both plaster and wood on a lathe. (A variety of such prepared forms for mold making are supplied by dealers.)

(1) Cover the table or modeling board with paper to protect it. The model must be closed so that no plaster can enter; consequently, fill the bowl with clay or, at least, close the opening. Invert the bowl with the clay inside on the table.

(2) If the model is “green” clay, do not size it. If it is a finished piece, the surface must be given a coating of size. See p. 160, Applying Size.

(3) Set up a wall about the model. Fig. 118. This may be of flexible cardboard, linoleum, or clay. The wall must extend at least 2 inches from the widest part of the model, and rise from 1 to 2 inches higher than the highest part. See that the wall is held firmly in place by a bank of clay wedged along the base and extending about 2 inches outward on the table.

Turn up the outer edge of the clay bank. Seal all open corners with clay.



Fig. 118. Pouring the one-piece mold for slip casting.

Tie the wall securely with cord, rope, or wire, both above and below.

(4) Prepare the plaster. The amount of plaster necessary will have to be estimated until one becomes experienced. Enough should be made to fill the mold at one pouring. Sift the plaster through the fingers slowly, letting it fall over the surface of the water. If lumps appear, break them or throw them out; if bubbles appear, blow them. Keep on sifting without stirring until the plaster seems to be coming up to the surface, which means that the water has absorbed all it can take.

Then, with the hand, reach in below the surface and agitate the water vigorously with the outstretched fingers until the mixture begins to thicken. Do not withdraw the hand until the mixture thickens, as this tends to create air bubbles. If one prefers to use a spoon, keep it under the surface and stir the mixture thoroughly until it begins to thicken. Do not withdraw the spoon. The plaster is then ready to pour.

(5) Pour the plaster gently over the bowl, filling the space around it to the top of the wall.

(6) In about twenty minutes the plaster will be set, but not hard. This is the time to remove the wall. Remove the wall. Trim up the edges of the mold while soft. Set the mold with the bowl inside, open side up, in a warm place to dry.

(7) In from forty-five minutes to one hour, the plaster will have set and the model may be removed. Sometimes gently tapping on the outside of the mold will release it.

(8) Sponge the mold, and set it aside in a warm place to dry. With the mold now complete, one may make as many slip casts of his model as he likes.

Slip Casting a Bowl in the One-Piece Mold

When preparing to cast a bowl in this one-piece mold, have at hand a container with a lip or spout that pours easily. Fill the container with slip, more than the required amount. The plaster cast is porous and therefore will absorb the water from the slip, leaving a deposit of clay on the walls of the mold. The extra slip must be used to keep the mold filled.

(1) See that the mold rests on an absolutely level surface; otherwise the form will not be evenly filled. When ready, pour the slip. Fill the mold to the top and let it run over the edge. As the water is absorbed, the level of the slip lowers.

(2) Continue adding slip, keeping the mold filled. In about ten to fifteen minutes scrape the overflow from the top and see just how thick the wall has become.

(3) When the wall reaches the desired thickness, usually

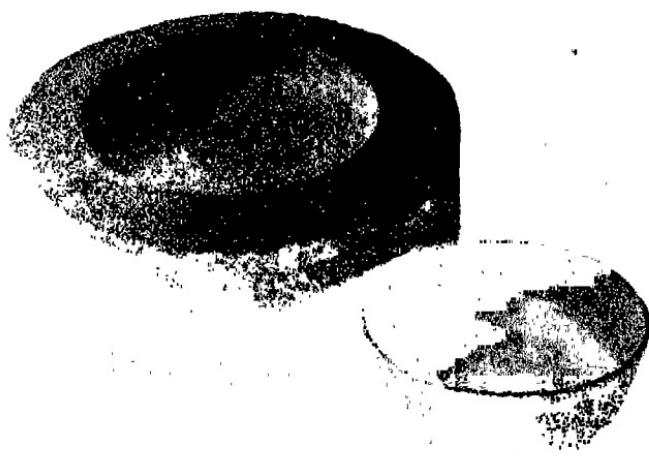


Fig. 119. The one-piece mold with the slip-cast bowl.

$\frac{1}{4}$ inch, turn the mold up and empty the remaining slip. Replace the mold in proper position. As the clay dries, it will gradually detach itself from the mold. If it should cling, a pen-knife may be used carefully to detach the rim.

(4) When firm but not leather-dry, the cast may be removed. The rim of the bowl is then smoothed with a moist sponge. Set the cast in a warm place to dry.

(5) Carefully sponge out the mold and place it also in a warm place to dry. Molds should always be kept in a dry place and never be permitted to become damp.

This mold may be used over and over again for slip casting, to make many replicas of the original model. Fig. 119.

After the slip cast has become bone-dry, it may be glazed and fired and thereby become an acceptable pottery piece.

The Two-Piece Slip Mold

Two- and three-piece molds are more generally used for

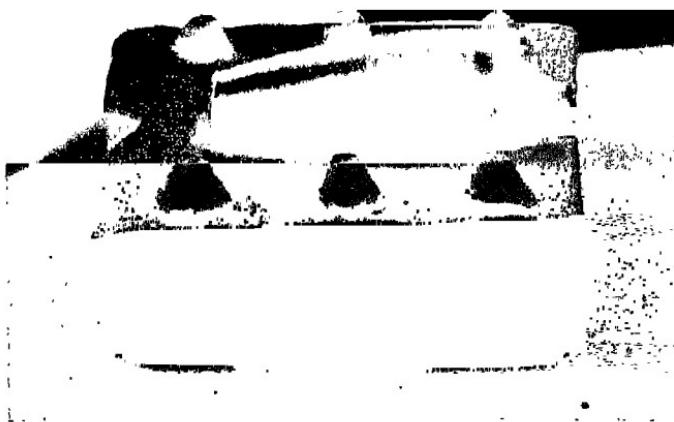


Fig. 120. The model imbedded in the clay block.

slip casting pottery forms than any other type of mold. These particular molds take care of forms with "turned in" curves which could never be pulled from a one-piece mold. These two- and three-piece molds are a ready means for increasing the supply of the first carefully designed model. The following directions are in consecutive order, first considering a model with a straight top and flat base:

(1) If the opening of the model is a straight edge, as in Fig. 120, the piece may be set flush with the top opening of the mold. Close the opening with clay to prevent the liquid plaster from entering the model.

(2) Draw a line about the model, marking the vertical center. This must be exact for, if it varies from right to left, the cast cannot be drawn from the mold.

(3) Prepare the clay block in which the model will be imbedded. This clay block should extend from all sides of the model, except the top, for a distance of from 2 to $2\frac{1}{2}$ inches, and be 1 inch deeper than half the model is wide. Imbed the

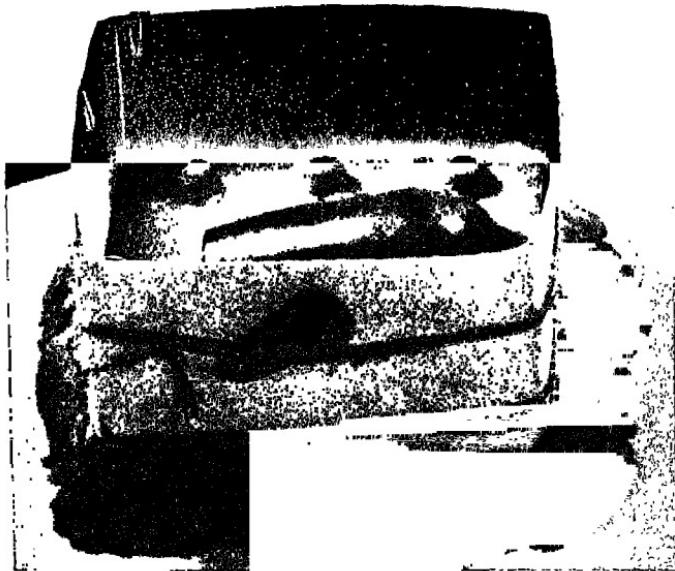


Fig. 121. The wall has been raised about the clay block, secured, and the piece is now ready for the plaster.

model in the clay block up to the line marking the vertical center.

(4) Add little clay knobs or "kcys" to the clay block, spacing them two or three inches apart on the inner surface near the edge. Fig. 120. These will form depressions in the upper section. With the projections on this side, a satisfactory "lock" of the two halves is assured. If one wishes, joggles may also be cut in the clay edges.

(5) If the model is plaster, wood, glass, or finished pottery, it must be given a liberal coating of size. See Applying Size, p. 160.

(6) Raise a wall of flexible cardboard, linoleum, or clay around the clay block and directly against it. This supporting wall must be on all sides of the block, and must be 1 inch higher than the highest part of the model. It must be firmly secured to the table or board upon which one works by clay

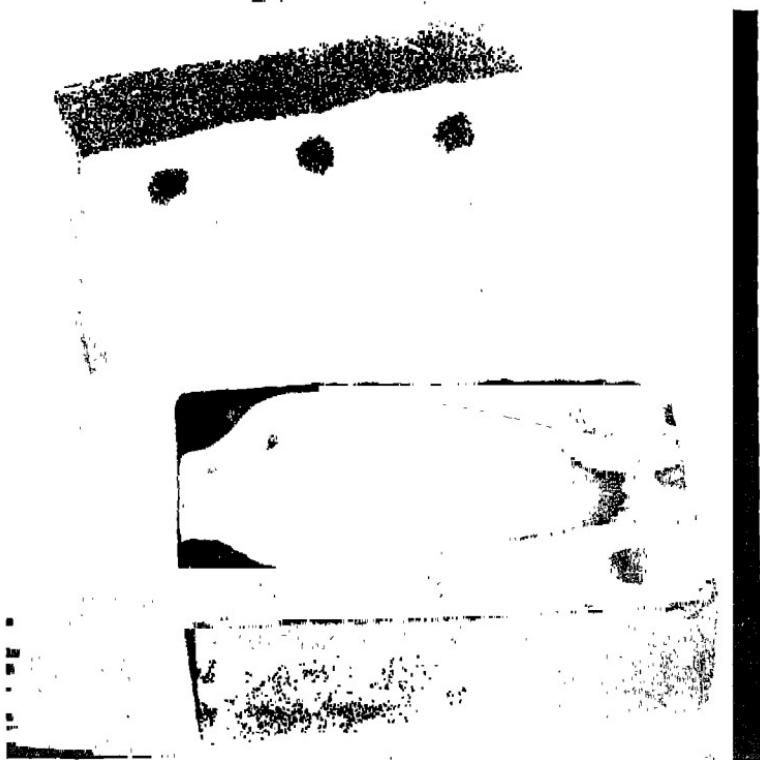


Fig. 122. Clay has been removed. The plaster block now becomes the base for the pouring of the second section.

packed around the base and carried up a little distance on the wall. The corners and any seam must be sealed. Tie the wall, above and below, with rope, cord, or wire. Fig. 121.

(7) Estimate the amount of plaster and prepare it. See p. 162. When plaster is ready (that is, of creamy consistency), pour slowly over the model, filling the form to the top of the wall, or at least to a depth equal to the clay block.

(8) After about twenty minutes, during which the plaster will have set sufficiently, remove the wall and trim the edges of the mold while the plaster is still damp.

(9) The mold now shows two halves—one of plaster, one

of clay. In about thirty minutes, after the plaster has set more firmly, turn the complete form over so that the plaster becomes the bed and the clay is the upper section. Remove the clay. Fig. 122.

(10) With a slightly damp sponge, wipe the exposed half of the model and the plaster segments surrounding it. Plaster instead of clay now surrounds the model. In order to prevent the plaster to be added from adhering to these segments and model, each must be given a thorough coating of size. Brush such coatings on the segments, taking special care of the depressions into which the knobs will fit. Go over the sized surface with a coating of sweet oil smoothed on with the finger.

(11) Replace the wall, making it secure as before. Mix the plaster and pour to the upper level, completing the mold form. Fig. 123.

(12) After the plaster has set about twenty minutes, remove the wall and trim up the edges.

(13) After about thirty minutes, insert a knife blade along opposite seams and tap gently. Soon the two halves will separate. Remove the model.

(14) Examine the walls of the mold. These must be sponged so thoroughly that not a trace of clay or plaster is left on the inside surface.

(15) Set the mold aside to dry. When thoroughly dry it is ready for as many slip castings as one would care to make.

Pouring a Slip Cast in the Two-Piece Mold

(1) Place the two sections of the mold together. Tie securely at both top and bottom. Seal the seams with clay. To make the mold even more secure, insert little wedges under the rope or cords to bring the sections still tighter. Fig. 124.

(2) Have the slip in a convenient vessel for pouring. Pour slip into the mold, filling to the top and a little over. Rock the mold to prevent air bubbles and make sure that the slip covers all sides of the mold.

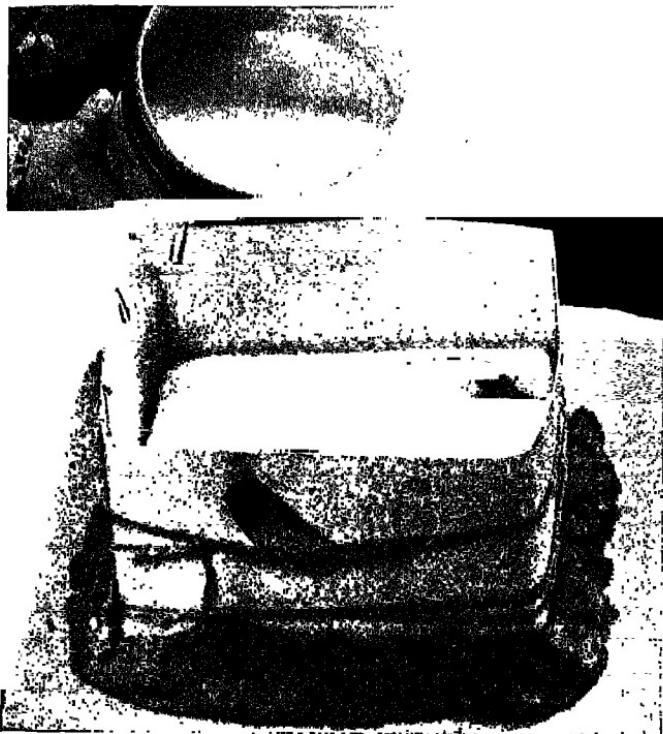


Fig. 123. Plaster block is walled and ready for the second pouring of the plaster.

(3) Soon a deposit of clay on the plaster walls will be seen. This is caused by the plaster absorbing the water from the slip. As the water is absorbed, the level of the slip lowers. Keep adding slip, filling to the top and going a little over.

(4) In about twenty to thirty minutes draw a knife across the top and see the thickness of the wall. When this is satisfactory, usually about $\frac{1}{4}$ inch, invert the mold and empty the remaining slip.

(5) Immediately set the inverted mold over two supports, usually two sticks, to drain.

(6) After approximately twenty minutes, turn the mold in the natural position and set it aside for a while. It will be found



Fig. 124. The two sections of the mold are now assembled, tied securely, and the slip is poured into the mold to form the cast.

that as the clay dries it detaches itself from the mold and gradually shrinks in thickness.

(7) In from twelve to twenty-four hours, the mold may be opened and the cast removed. Set it aside to dry thoroughly. Fig. 125.

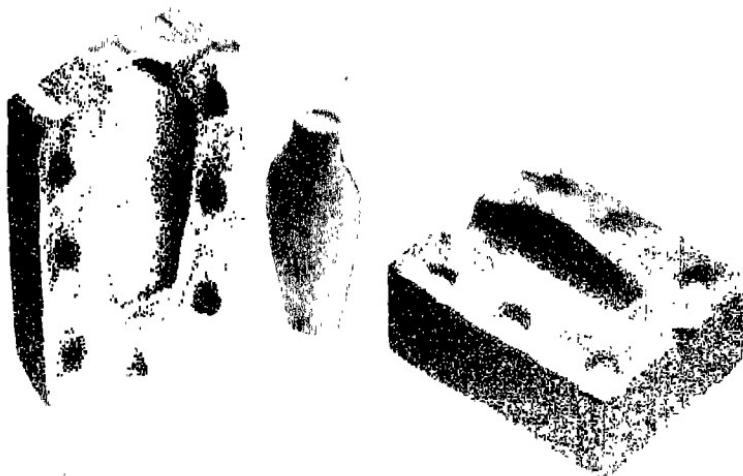


Fig. 125. The two sections of the mold separated, showing the mold form and the slip-cast vase.

Such a piece is very fragile and must be handled with great care.

All casts show a threadlike line of clay where the slip has seeped into the seam between the two sections of the mold. After the cast has become firm, but not dry, this can be readily removed with a sharp penknife, then brushed over with a fine sandpaper, and finally smoothed with the dampened finger. When bone-dry, it is ready for the first or biscuit firing.

If decoration is planned, either in slip painting, relief, or incised line, this must be carried out while the piece is firm but not in a leather-hard condition.

The Three-Piece Slip Mold

Many pottery pieces have not only a curved lip but also a concave base. Such forms could not be "pulled" from a two-piece mold; consequently, a three-piece mold must be made.

For the illustration, Fig. 126, a hand-built vase, glazed and fired, with a curved lip and concave base, was chosen as a

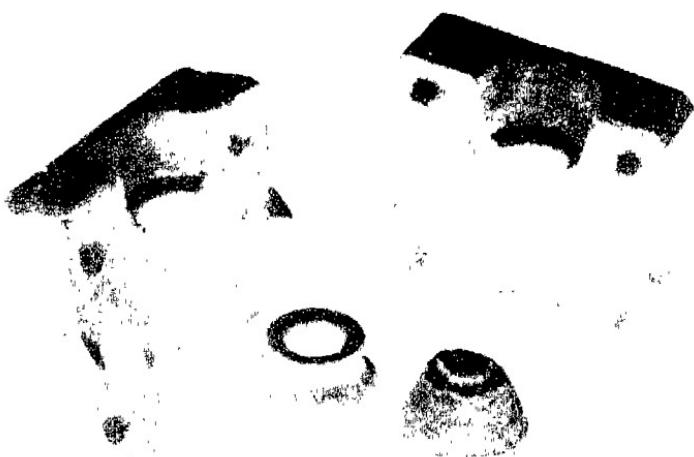


Fig. 126. The three-piece mold, showing the two side sections, the base section, and the slip-poured vase.

model. In making such a mold, one proceeds in much the same way as when making a two-piece mold.

(1) Draw a line on the surface of the model, marking the vertical center. This must be exact.

(2) Close the opening of the vase with clay. Because of the curved lip, the top cannot be set flush with the top of the mold; consequently, a "spare" is made. This is a clay form built to fit over the closed opening and extending to the top of the mold. (See impression of "spare" in the mold, Fig. 126.) Prepare the "spare."

(3) Since the base is concave, a section must be prepared for this. The mold proper consists of three pieces—the two side sections and the base—hence, a three-piece mold. The "spare" is no part of the mold proper, but provides the opening for pouring the slip. Prepare the base.

(4) Prepare the clay block as in the two-piece mold. Imbed the model with the "spare" and base in place. (Remove necessary clay in clay block and fill in afterward.)

(5) Coat the exposed section of the vase with size; then smooth on a covering of sweet oil.

(6) Place wall around clay block as in two-piece mold. Fig. 121. Prepare plaster and, when ready, pour over the model, filling the space to the top of the wall.

(7) In about twenty minutes, remove wall. Turn the complete piece over, the plaster becoming the base and the clay uppermost. Remove the clay bed, but keep the spare and base in place.

(8) Wipe the exposed half of the model with a damp sponge; also the plaster segments surrounding the model. Coat model, plaster segments, spare, and base with size.

(9) Replace wall. See Fig. 123. Prepare plaster and pour over model, filling space to the top of the wall.

(10) After the plaster has set sufficiently, remove wall. Turn the complete plaster form on end, base uppermost. Remove clay base from mold. Size thoroughly the concave space within the mold and the plaster segments surrounding the base.

(11) Mix only sufficient plaster to fill the base section. Pour plaster into open base section.

(12) In about thirty minutes, insert a knife blade in the seams of the mold and, by tapping gently, the mold will open. The spare may then be removed, as well as the three sections of the mold.

(13) Complete the sponging and drying of the three-piece mold, as for the two-piece mold.

Pouring a Slip Cast in the Three-Piece Mold

(1) Assemble the three sections of the mold. The clay spare is now discarded and its place becomes the opening through which the slip is poured into the mold. Tie the mold

so securely that it seems as one piece. Tighten the sections still more by placing wedges under the cord or rope.

(2) For each step in pouring the cast, follow the directions under Pouring a Slip Cast in a Two-Piece Mold, p. 168.

When completed, the mold opened, and the slip cast removed, the various sections will resemble in number those shown in Fig. 126.

The slip-cast piece, after the seam line has been removed, should be set aside to dry. If any decoration is planned, this should be applied before the piece is leather-hard. Finally, after drying to the bone-dry stage, the piece is ready for the first or biscuit firing.

Slip Casting of Figurines in a Two-Piece Mold

If the designer of figurines "in the round" wishes to cast his model in slip, to be followed by firing and glazing, he will probably use a piece mold. The simplest form of the piece mold used in figure casting is the two-piece mold similar to the two-piece mold used in casting pottery forms. Naturally, the choice of mold depends upon the type of model. If the figure is compact, with no undercuts or returns, it most likely may be cast in a two-piece mold.

Figures with many undercuts and extensions present a very complicated problem and one which the amateur would scarcely undertake. Many of the eighteenth-century figures were so complicated that from twenty-five to one-hundred molds were sometimes necessary to complete one figure. Hands, arms, and even fingers; flowers, and fans, etc., were often cut from the figure and individual molds made of each. These were then assembled and firmly cemented with slip to the main body, thus rebuilding the figure. These figures were porcelain and went through the firing process, in which the clay was vitrified.

The two-piece mold made like the two-piece mold for pottery forms will take care of a figurine not too complicated. If more complicated figures are designed, the various sections

have to be cast separately, then the parts assembled and cemented together with slip.

A Two-Piece Slip Mold for a Figurine

In planning to slip cast a figurine, make sure that a satisfactory division of the figure can be made. The two sections need not be halves, as in casting a pottery piece. Note in Fig. 127 that the contour is very near the half mark until the head is reached. Here the dividing line has followed the highest point in the outline, so that each section may be easily removed from the mold.

Further, observe that in this mold one of the knobs or "keys" is placed in an advantageous position to help release the head. A knowledge of such "knacks" in mold making comes with experience.



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Fig. 127. The two sections of the two-piece mold and the slip-poured figurine.

In all figure molds, a spare is placed at the base. This provides the opening through which the slip is poured into the mold.

Proceed with the mold as follows:

- (1) Draw a line dividing the figure. This line must follow the highest point in the contour. This is most important.
 - (2) Prepare the spare to fit the base.
 - (3) Prepare the clay block, providing a place at the base for the spare. Fig. 127.
 - (4) Imbed figure with spare in clay.
 - (5) If the model is green clay, it need not be sized; if a finished figure, it must have a coating of size followed by sweet oil smoothed on with the finger.
 - (6) Proceed as in the two- and three-piece molds:
 - (a) Set the wall around clay block and secure it.
 - (b) Prepare plaster and pour over model, filling form to the top or at least to the thickness of clay block.
 - (c) In about twenty minutes, remove wall and trim edges of plaster.
 - (d) Turn piece, so clay is uppermost. Remove clay.
- The first section is now complete. Proceed with the second half of the mold.
- (1) Wipe with a damp sponge both the half model released and the surrounding plaster segments and spare. Leave the spare in place.
 - (2) If the model is green clay, it should not be sized; if a finished piece, a coating of size on the model and all plaster segments, followed by an application of sweet oil smoothed on with the finger, insures smoothness.
 - (3) Replace the wall. See that the spare is in place. Prepare plaster and pour second section.
 - (4) In about twenty minutes, remove wall and trim edges.
 - (5) In about thirty minutes, a knife blade inserted in the seam and gently tapped upon will cause the mold to open. Remove the spare; also the model.

(6) Proceed as in all mold making; sponge the mold thoroughly and set aside to dry.

Pouring a Slip Cast in This Two-Piece Figure Mold

(1) Tie the two sections of the mold together. Draw the sections still closer by placing wedges under the rope or cord. Seal all seams with clay.

(2) The base of the mold now becomes the top. Set the mold on a level surface and see that it is secure.

(3) Prepare slip. This should be of creamy consistency and pouring quality.

(4) When ready, fill to the top of the mold and a little over. Tip and turn mold to prevent air bubbles.

(5) The level of slip lowers as the plaster draws the water from the slip. Keep adding slip, filling to the top and over.

(6) After thirty minutes, draw a knife across the top and ascertain the thickness of the slip wall. When about $\frac{1}{4}$ inch in thickness, invert mold and empty the remaining slip.

(7) Set the mold, inverted, over two supports to drain. In about thirty minutes, return mold to proper position and set aside to dry.

(8) After about twelve hours, a knife blade inserted at the seam and tapped upon will cause the mold to separate. Remove the model. Fig. 127.

The very fragile model should be carefully handled. When about leather-dry, remove the seam mark and set aside to dry thoroughly. When bone-dry, it is ready for the first or biscuit firing.

MOLDS FOR PLASTER CASTING

(1) One-piece mold in which the model is in panel form, in relief.

(2) Two-piece mold in which the model may be easily removed from the mold.

Molds for plaster casting are somewhat similar to those

made for slip casting. One point, however, is important: that is, no mold that has been used for slip casting should be used for plaster casting, and plaster-casting molds cannot be used for slip casting.

The One-Piece Mold for Plaster Casting

The simplest mold for plaster casting is the one-piece mold in panel or tablet form, modeled in low relief, and with no undercuttings. Fig. 128. In making such a mold, proceed as follows:

(1) Place the model, either green clay or a finished piece, on a perfectly level table, modeling board, or, better still, a piece of plate glass. Apply a coating of size, if the model is a finished piece, followed by an application of sweet oil smoothed on with the finger. If green clay, no sizing is necessary.

(2) Set up a wall of flexible cardboard, linoleum, or clay about the model. The wall must be 1 inch higher than the highest part of the model. Set the wall directly against the sides of the model, or, if a border is planned set it the width of the border from the edge.

(3) Secure wall with clay wedged firmly along base, and reinforce the wall with rolls of clay set some distance up on the wall. Seal all corners and seams with clay. Strengthen the wall by tying with rope, cord, or wire.

(4) Prepare plaster. Pour slowly over model, just enough to cover the surface, usually about $\frac{1}{2}$ inch in thickness. Blow plaster vigorously into all parts of the surface.

(5) Pour in more plaster, covering the panel. Tip and turn the panel to avoid air bubbles. Fill the mold to the top.

(6) Level the top by drawing a straightedge across it. The mold will rest on this top surface when turned over. Casts should be strong but not too thick; consequently toward the outer edge, if the relief is very low, the plaster may be thinner.

(7) Let plaster set for twenty minutes. Remove wall.

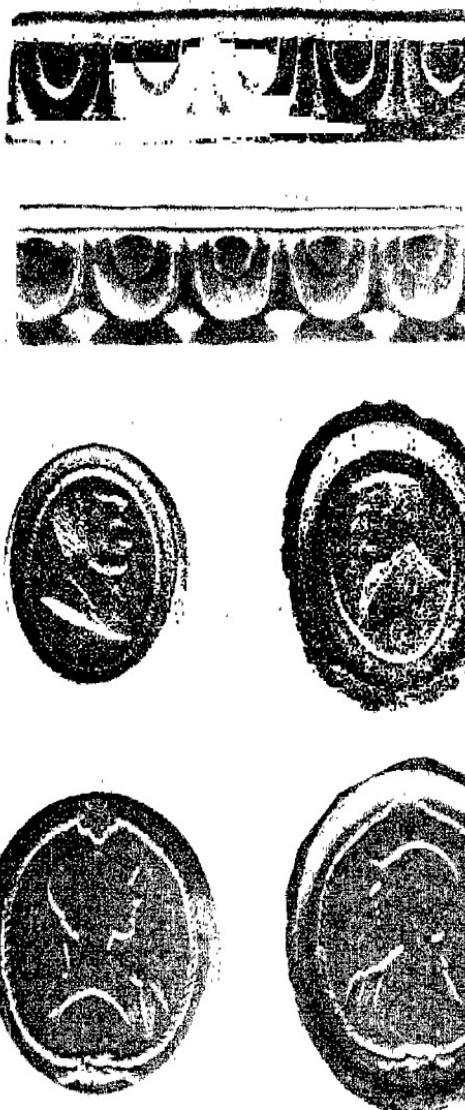


Fig. 128. One-piece plaster molds with cast of each.

While the plaster is still damp, use a tool or knife and make a beveled edge where the mold meets either table or model.

(8) After about thirty minutes, insert a knife blade in the beveled edge and tap gently. This will loosen the mold and it may be lifted and the model removed. If the model is green clay, the mold may be turned, face up, and the clay removed in pieces, if necessary.

(9) After the model is removed, place mold, face up, on the table to dry.

The mold, after the model or clay is removed, should show an exact replica of the model with the design or relief sunk—that is, in reverse from the original. Fig. 128.

The plaster mold must then be sponged so thoroughly that not a particle of clay or size clings to the wall. When thoroughly dry, it will be in condition to consider the making of the cast.

Plaster Casting in This One-Piece Mold

Since plaster adheres to plaster, the plaster mold must be given a thorough sizing to prevent this. In this one particular, molds for plaster casting are essentially different from slip-casting molds, whose walls are never treated against absorption. In fact, the value of the slip mold lies in the fact that the plaster absorbs the water from the slip, leaving the deposit of clay on the plaster walls.

In sizing the plaster-casting mold, the size should be rubbed vigorously into all parts of the surface; then, to aid still further in securing a smooth cast, go over the entire surface with sweet oil, smoothing it on with the finger.

Before preparing the plaster, one should decide how this flat panel is to hang. If one or two hangers are decided upon, they should be prepared and in readiness. Select a wire from 4 to 6 inches in length, bend it to form a loop, bring the long ends down together, twist them, and turn the ends at opposite angles and flat against the plaque. This, imbedded in the plas-

ter, will hold the piece firmly. If the wire is to be set in the edge instead of at the back, with a pointed knife make two holes through the edge of the mold and insert the ends, bringing them together and then turning them at right angles.

With the above preliminaries completed, one is ready to proceed with making the cast.

Pouring a Plaster Cast in This One-Piece Plaster Mold

(1) Place the mold, thoroughly sized, face up upon a perfectly level table.

(2) Prepare the plaster. When ready, pour a little at first, slowly covering the surface of the mold with a thin coating, vigorously blowing upon it to send it into all the lower parts of the mold.

(3) Add more plaster, tip, and turn the mold, assisting thus in covering the surface. Fill to the brim. See that the hangers are in place before the plaster sets.

(4) Place at one side until the plaster sets, probably from thirty to forty-five minutes. The cast and mold should be separated as soon as it is possible to do so without injury to either the cast or mold; that is, before the plaster becomes too hard.

(5) Insert a knife blade along the beveled edge and tap gently upon it. This will loosen the mold and it may be removed.

(6) Examine the cast and, if any imperfections appear, correct these before the plaster becomes hard.

A second device often used to aid in the separation of mold and cast, especially where the pieces are large, is in the use of little wooden wedges. These are placed—one, two, or three—along the opposite edges of the mold and remain in place while the plaster is being poured. When ready to remove the mold, a gently tapping upon opposite wedges easily releases it.

Holes in a mold or a cast indicate air bubbles and are evidence that the plaster was poured too quickly; if dappled with dots over a large area, the plaster was too stiff.

All imperfections in a plaster cast should be corrected immediately. A small amount of liquid plaster will adhere firmly to freshly set plaster or plaster saturated with water. Advantage may be taken of this to make necessary repairs.

When the cast is completed to one's satisfaction it is then ready to receive an attractive finish. See Chapter Thirteen, A Finish for the Plaster Cast.

The Two-Piece Mold for Plaster Casting

In choosing a model for casting in plaster in a two-piece mold, emphasis must be placed upon simplicity of design. The figure must be compact in form—no undercuts, no returns. The model must be such that the cast may be taken from the mold without injury to either the cast or mold. In Fig. 129, note the simple areas of the surface—no undercuts, no returns.

The two-piece mold for plaster casting is made very much like the two-piece mold for slip casting a figure. Since a figure is used, the spare is placed at the base of the mold and becomes the opening through which the plaster is poured into the mold. The base is now referred to as the "top" of the mold.

The figure must be divided into two parts. These are not necessarily halves as in pottery forms, for the line must follow the highest point in the contour. Consequently, in drawing the line, keep to the highest point in the outline, constantly studying the form to see that each side recedes from the line. The line will probably vary considerably, and most likely will never be a straight line as in a pottery form.

Proceed as follows:

(1) Draw a line on the model, dividing it into two parts. Make sure that each part can be taken from its section without injury.

(2) Model the clay spare with flaring sides and with a margin of 1 to 2 inches around the base of the figure. See Fig. 129. Place the figure upon this base.

(3) Prepare the clay block in which the model (with the



Fig. 129. The two-piece plaster mold with the plaster cast.

spare) will be imbedded. The block should extend from all sides of the figure from 2 to $1\frac{1}{2}$ inches, and be 1 inch deeper than half the model is wide. The base of spare should be set flush with the base of the block.

(4) If the model is other than green clay, it must be thoroughly sized. See p. 160. Set up the wall of flexible cardboard, linoleum, or clay, making it 1 inch higher than the highest part of the model and securing it with clay wedged firmly about the base. See Fig. 121. Tie the mold both above and below with cord, rope, or wire.

(5) Prepare the plaster. Pour the upper half of the mold. After twenty minutes, remove the wall and trim the edges of the mold. Turn the block, with the plaster section still in place, so that the clay is uppermost. Remove the clay.

One section of the mold has now been completed. Plaster surrounds the model and the spare is still in place at the base. Continue with the second section of the mold.

(6) Thoroughly size the plaster segments surrounding the model, the spare, and also the model itself, if it is a finished piece. Replace the wall and make it secure.

(7) Prepare the plaster for the second section. When ready, pour plaster, filling the space to the top of the wall or at least to the same thickness as the first section.

(8) After about twenty minutes, remove wall and trim edges of the mold. In about thirty minutes, after the plaster is firm, a knife blade held at the seam and tapped upon gently will cause the two sections of the mold to separate and the model may be removed.

If the model is green clay it may be taken from the mold in pieces; if it a finished model, it may have to be coaxed a little. Holding it under a faucet of hot running water and letting it rest for a while will soften the size and help release the form.

With the model released, the mold must now be thoroughly sponged and given a generous coating of size to prevent the plaster to be added from adhering to the walls.

Pouring a Plaster Cast in This Two-Piece Plaster Mold

(1) Size the walls of the mold. See p. 160. After the last coating of size, smooth the walls with sweet oil worked well over the surface with the finger. Fig. 129 shows finished mold.

(2) Tie the two sections of the mold together. Omit the spare. Force the walls still tighter by slipping little wedges under the rope or cord. Fig. 124. Seal the seams with clay.

(3) Set the mold, with the open end uppermost, on a perfectly level table.

If a model is small it probably will be cast solid. This additional weight in a small piece is a decided advantage, for it helps to sustain equilibrium and keep the piece upright.

For a small, solid cast, proceed as follows:

(1) Prepare the plaster to an easy-flowing consistency. When it is ready, pour gently into the mold, filling only to the base of the figure.

(2) Tip and turn the mold to avoid air bubbles and to make sure the plaster reaches all parts of the mold.

(3) If the plaster at the base of the figure should sink a little, keep it filled to the proper level.

(4) Place aside for the plaster to set.

If the mold is a large one and not to be cast solid, the plaster is poured in sections. First, fill the mold about one third. Turn and tip it to make sure that every part of the surface is covered. Empty this plaster and fill with a fresh mixture. Watch the plaster as it sets and gradually gains in thickness. When it has gained the desired thickness, usually $\frac{1}{2}$ to 1 inch, depending upon the size of the model, the mold is inverted and the remaining plaster emptied. The piece is then set aside from thirty to forty-five minutes, during which time the plaster will gradually set so that the mold may be opened. With a knife blade or blunt chisel held on the seam and gently tapped upon, the two sections will separate. The cast may then be removed.

If the cast is difficult to remove, holding it under hot running water will soften the size and help release it.

After removing the cast, examine it to see if any repairs are necessary. A new cast is soft and easily cut. If any imperfections appear, they may be corrected now better than later. A little freshly mixed plaster will often correct any small injury. A little ridge will be seen, caused by the plaster having seeped into the seam between the two sections of the mold. While the plaster is still damp use a small, sharp penknife to cut this away and, in doing so, avoid touching the adjoining surface of the cast. The seam may then be lightly touched with fine sandpaper and smoothed with the dampened finger. The

cast is then ready to be properly finished. See Chapter Thirteen, A Finish for the Plaster Cast.

PRESS MOLDS

- (1) One-piece press mold.
- (2) Two-piece press mold for pressing pottery forms.
- (3) Press molds for plates and shallow dishes.
- (4) Press molds for figures.

Molds for pressing flat and some hollow pieces with slabs of clay are much the same as one- and two-piece molds, already described, with the exception that no opening is necessary for pouring. Slip-casting molds, however, may be used as press molds.

One-Piece Press Mold

The one-piece press mold may be used to advantage in pressing tiles, reliefs, and ornamental designs often used in embossing pottery forms. First, the model must be prepared, then the mold made. The model should be free of all undercuts so it can easily be taken from the mold.

Prepare the mold as follows:

- (1) Place the model, face up, on a level table. If a tile with the four areas of the base indicated, place base uppermost. Fig. 130.
- (2) Set up cardboard wall 1 inch higher than highest part of model and about 2 inches from it.
- (3) Prepare plaster and pour, filling space to top of wall.
- (4) After twenty minutes, remove wall. Turn mold with clay uppermost.
- (5) Remove clay.
- (6) Sponge mold. It is then ready for use.

When pressing any clay form, it is essential that the mold be dusted with powdered chalk or talcum powder; otherwise, the pressed piece will not come from the mold in a satisfactory condition.

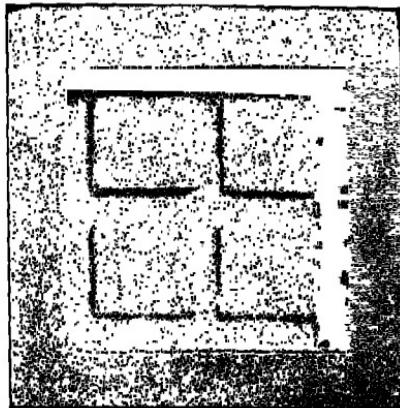


Fig. 130. Press mold for tile, showing the four sections of the base removed.

Proceed with pressing the clay in this one-piece press mold:

- (1) Dust the mold with chalk or talcum.
- (2) Fill piece by piece with clay well worked together. Smooth surface.
- (3) When filled, draw a taut wire or straightedge over the surface to remove excess clay.

The pressed piece may be taken from the mold almost immediately, unless the clay is too soft to handle. If so, let the clay remain in the mold until it stiffens enough to be removed.

Two-Piece Press Mold

Pottery forms are frequently pressed in a two-piece press mold, using clay slabs in order to make the piece hollow. The mold is similar to the two-piece mold for slip casting. See p. 171, Fig. 125.

- (1) Lay the two pieces of the mold open on the table. Dust each section with powdered chalk or talcum.
- (2) Roll out two slabs of clay about $\frac{1}{4}$ inch in thickness. Smooth and polish one side of each with a palette knife.
- (3) When ready, lay each of these smoothed slabs, polished side down, in each of the two sections of the mold.

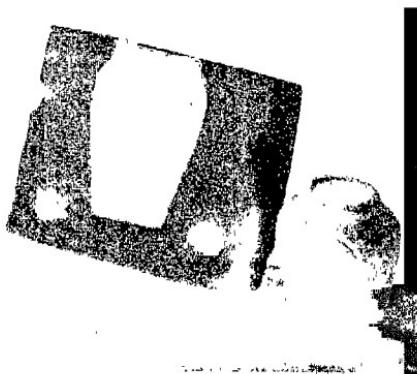


Fig. 131. Pressing a hollow pottery form, and showing the side of the slab form bevelled.

(4) Pat with a damp sponge, working from center to outside edge. Remove excess clay.

(5) Bevel the edges of the slabs so when they are placed together a wide, V-shaped seam runs along the inside of the mold.

(6) Join the two halves of the mold and tie securely.

(7) Roll out two ropes of clay. These are to be wedged into the V-shaped seam. First, coat the seam generously with slip. Insert the rope of clay and press firmly into the seam. (Use the fingers as much as possible, aided by a tool with a flattened end.)

(8) After two or three hours, the clay will be sufficiently firm; the mold may be opened, and the piece removed. Fig. 131.

Any repairs should be made while the clay is in a leather-dry condition. If decoration is planned, this, also, must be added while the clay is leather-dry.

Making a Press Mold for Plates or Shallow Dishes

In making such a press mold, there are two preliminary steps to be taken before the final form can be pressed; namely,

(A) The mold of the undersurface of the piece must be secured.

(B) The mold of the inside surface of the piece must be prepared.

In preparing (A) above, proceed as follows:

(1) Select a model, fill with clay. (In this instance a finished plate has been chosen.)

(2) Invert model, as described in The One-Piece Mold, p. 161. See Fig. 118.

(3) Set up cardboard wall, about 2 inches from model, making it about 3 inches high. Secure as directed.

(4) Size base of model. Prepare plaster and pour to top of wall.

(5) After twenty minutes, remove wall. Turn mold, plate up. Remove plate.

(6) Cut three or four joggles in the rim of soft plaster.

The mold for the undersurface is now complete, and becomes the base for preparing the mold for the inside surface of the plate. Follow by making this mold.

(1) Place the plate in position in base mold.

(2) Size plate and surrounding plaster surface.

(3) Place wall, about 7 inches high, directly against the plaster base. Secure wall.

(4) Prepare plaster and pour to top of wall. Fig. 132. (This will give necessary pressure.)

(5) After about twenty minutes, remove the wall.

(6) After the plaster has set more firmly, about thirty minutes, separate the two sections of the mold. Remove the plate.

The two molds for slab pressing a plate are now complete. Sponge out the molds and set aside to dry. The mold will then be ready for pressing the slab cast of the plate.

Pressing the Slab Cast of the Plate

(1) Dust both molds with powdered chalk.

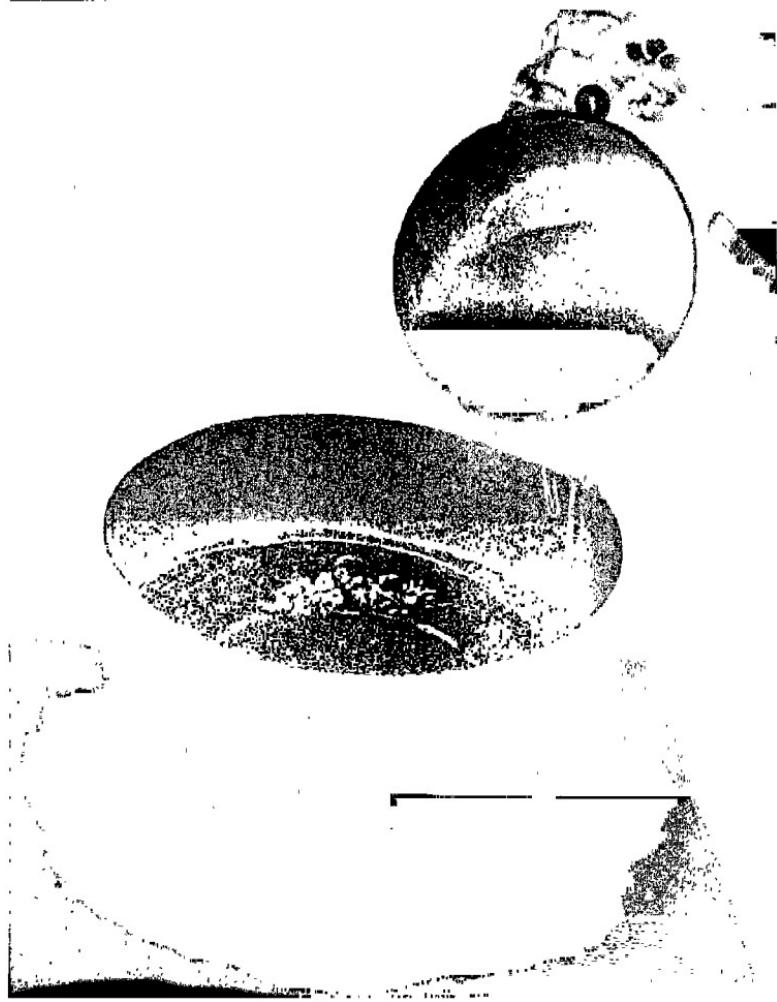


Fig. 132. Pouring the mold for the surface of a plate.

(2) Roll out a slab of clay about $\frac{1}{4}$ inch in thickness and a little larger than the mold to be covered. Smooth, and polish the surface with a palette knife.

(3) Lift clay and place, polished side up, in lower mold.



Fig. 133. Pressing a plate.

With a dampened sponge, smooth and pat the clay into the mold, working from the center out. This will probably extend edges over edge of plate. Trim edges.

(4) When ready, take the upper mold and carefully press down on the clay. See that the joggles fit. Leave about twelve hours. Fig. 133.

(5) Remove upper mold. Very carefully remove plate. Set aside to dry more thoroughly.

If any small depressions should appear in the surface, fill these up with soft clay and slip, then smooth with a dampened sponge. Sometimes a fine sandpaper may be touched over the surface and then a dampened sponge used as a finish.

The plate is now ready (leather-dry) for any decoration one may care to add.

Two-Piece Press Mold for Figures

Small figures with no undercuts or returns may be cast solid in a two-piece mold similar to the two-piece slip mold for figures. Fig. 127. Proceed in the following manner:

(1) Prepare the two sections of the mold for the clay slabs by dusting with powdered chalk or talcum.

(2) Build each section up with pieces of clay firmly wedged into all parts of the mold. See that the edge of the figure is well defined.

(3) Brush a thick coating of slip over the exposed flat surface of each half of the model.

(4) Join the two sections of the mold and tie securely. Force them still tighter by placing little wedges under the rope or cords.

(5) Leave clay in mold for twelve hours.

(6) Next, open the mold and remove the solid clay figure.

Sometimes such a figure may be lightened by removing some of the clay, hollowing out with a tool.

FLEXIBLE MOLDS

Flexible molds are made from molding jelly, gelatine, and treated rubber. Such materials have more or less elasticity, a quality that the rigid plaster does not possess. Rubber especially has great resiliency and, when stretched, turned, or twisted, springs back into its original shape. For this reason, rubber molds are often preferred for figures with undercuts and slight extensions. Such molds are often used successfully for other forms, especially relief plaques and book ends.

Rubber molds are long lasting, and such a mold, if well made, may be used many times. Gelatine molds and those of similar type sometimes shrink considerably and therefore the number of casts from a mold is limited.

All flexible molds are used only for plaster casting or for materials similar to plaster, and never for slip casting. Rubber and gelatine molds cannot absorb water from slip and, consequently, a mold cannot form.

In making rubber molds, two forms of treated rubber are necessary: first, a liquid rubber applied for first coatings; second, a rubber paste applied over these first coatings. The paste, always laid on with a spatula, strengthens the mold by giving support to the rubber wall. The mold so strengthened can then support the liquid casting material poured into it to form the cast. If the wall is not sufficiently supported, the weight of the plaster poured into the mold causes the rubber to expand and to such a degree as to lose the form.

For the first experience in making a rubber mold, it is best to choose a model with a base somewhat larger than any part of the form; that is, the figure should grow less bulky toward the top. When the base or opening is small, it is difficult to remove either a model or a cast, if it has to be pulled up over much larger areas. In fact, it can scarcely be done successfully without cutting the mold. Frequently, it is necessary to cut a mold the length of one side to remove first the model and later the cast, and often two sides have to be cut.

When molds have to be cut, and before a second cast is poured, the seam or seams must be very accurately fitted together, secured with thin strips of adhesive tape, and then sealed with one or two coatings of liquid rubber.

A mold is usually given a minimum of four coatings of liquid rubber, followed by two, three, or four coatings of the paste, depending upon the size of the model. A small model may take only two coatings of paste. Finally, the liquid rubber is applied over the last coating of paste.

Full directions for using the rubber mold are usually supplied with the materials. The following instructions give a general idea of the steps taken:

The Rubber Mold

(1) Fill the brush to be used with warm soap suds and carefully wipe away the excess. This is a protection to the brush to avoid hardening after using liquid rubber.

(2) Secure the model in place upon the table or modeling board by coating around the base with liquid rubber and carrying it out from 1 to 2 inches on the surrounding surface. This holds the model in place. The extension is also useful when removing the mold.

(3) Beginning at the top, paint the model from the top down. Cover every part of the surface, leaving no air spaces between surface and coating. Such air spaces create air bubbles which disfigure the mold; consequently, the cast is imperfect.

(4) Shortly, the first coating changes color, usually growing darker, and some rubber becomes transparent. In about one hour, the first coating is sufficiently dry to add a second, a third, and then a fourth, allowing one hour between coatings. Four coatings are the least to be applied for satisfactory results.

(5) The rubber paste is now applied with a spatula. Set aside to dry for one hour.

(6) Apply a second coating of paste, a third, and possibly a fourth, allowing one hour between coatings for drying.

(7) Finally, go over the last coating with the original liquid rubber. Set the mold aside to dry for twenty-four hours.

After the allotted time for drying, the model must then be removed from the mold. Proceed as follows:

(1) Loosen the outer edge of the surrounding mat on the table.

(2) Gently pull the mat up, and gradually work it up and over the top of the model. If it appears difficult, one side may be cut with a razor blade or very sharp-pointed scissors.

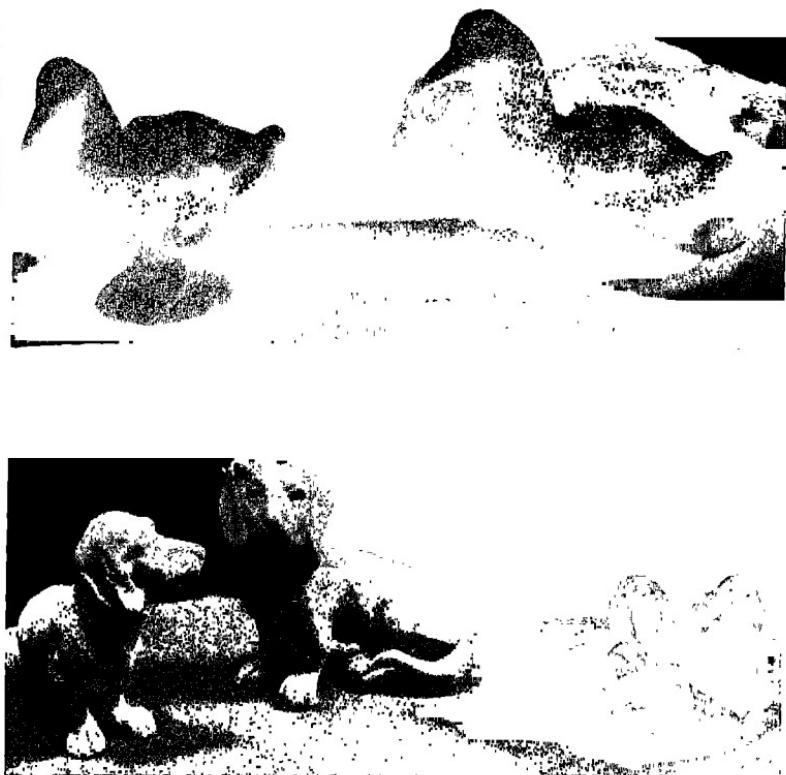


Fig. 134. Flexible molds.

Sometimes just a small cut will relieve a difficult situation.

If any cuts had to be made in the mold, these must be sealed as directed, p. 193, before the cast is poured. Follow by pouring the plaster to form the cast.

Pouring a Plaster Cast in the Rubber Mold

- (1) Wipe the mold walls with a damp cloth.
- (2) Prepare a half-and-half mixture of glycerine and water. Using a brush, go over the entire inner surface with this mixture. This will help in removing the mold.

(3) Invert the mold. Brace it so that the base which is now open is in a horizontal position. See that the mold is firmly supported.

(4) Prepare the plaster. When ready, begin filling the mold, jarring it to prevent bubbles. Fill the mold to the top. Smooth off excess plaster at the opening with a straightedge.

(5) Let stand twenty-four hours. Remove mold by slipping it from the cast. (If seams have been sealed, recut them.)

(6) Examine the cast. Correct any injuries before plaster hardens. Set cast aside to dry thoroughly.

(7) Sponge mold, and, as a protective measure, brush surface with mixture of glycerine and water. The mold may then be used for other castings.

With the cast completed, it is now ready for an attractive finish. See Chapter Thirteen, A Finish for the Plaster Cast.

WASTE MOLDS

"Waste" or "chipped" molds are so called because the mold is "chipped" or "wasted" in releasing the cast. Such molds are used when only one cast of a model is made.

In making waste molds, the general process is the same as making plaster molds with this difference:

(1) When the plaster is being poured over the model, it is poured in one, two, or three layers, and each layer is covered with a coating of slip before the next layer is poured. This causes the plaster to be chipped away easily, because plaster and slip do not adhere.

(2) In pouring the plaster, the first coating is tinted, usually with a little ochre, bluing, or ink. The color is immaterial; any other would do as well. As glimpses of the tinted plaster are seen, it is a reminder that one is nearing the cast and must be careful in proceeding.

The One-Piece Waste Mold

The flat panel in low relief, with no undercuts or returns, is

the most simple model to cast. See p. 179. Since, however, a waste mold is now to be made, undercuts and returns will cause no great difficulty. Consequently, a wall decoration, a head in relief, is selected as the model. The progressive steps in preparing any one-piece waste mold are as follows:

- (1) Coating of tinted plaster about $\frac{1}{8}$ inch in thickness.
(Tint water before adding plaster.)
- (2) Coating of slip over first coating of plaster to within $1\frac{1}{2}$ inches of outside edge. (This $1\frac{1}{2}$ -inch margin gives the new plaster a chance to join the previous layer. If the slip extended to the edge, the plaster would not adhere firmly.)
- (3) Layer of plaster, heavier than first coating.
- (4) Coating of slip to within $1\frac{1}{2}$ inches of margin.
- (5) Layer of white plaster, which may be the final application of plaster. Smooth surface.

Continue as follows:

- (1) Allow one-half hour for plaster to set.
- (2) Turn mold so clay is uppermost.
- (3) Remove clay from mold, in pieces, if necessary.
- (4) Follow directions for sponging the mold and preparing the walls against absorption. See p. 160, Applying Size; also, pp. 180 and 181, Plaster Casting in This One-Piece Mold.

When this is completed, the mold is ready to receive the plaster for the plaster cast. Before preparing the plaster, however, a wire hanger, if necessary, should be prepared. See p. 181.

Pouring a Plaster Cast in a One-Piece Waste Mold

- (1) Prepare the plaster as directed, p. 162.
 - (2) Pour about half into the mold, turning and tipping the mold to prevent bubbles, then fill to the top.
 - (3) While soft, level the top by drawing a ruler across it.
 - (4) Allow one hour for the plaster to set firmly.
- Since this is a waste mold, the mold will be chipped away.

To proceed, lay the mold with the cast within, on a soft padding, a folded blanket, carpet, or pillow. This will lighten the effect of the vibration caused by the chipping. Then, with a blunt chisel and light mallet, begin chipping away the plaster. Fig. 135.

This will not be difficult, because the slip coatings have made the layers nonadhesive. Begin with the outer coating. Keep the ball of the hand resting on the mold and the chisel at right angles. Tap very lightly and keep full control of the chisel, moving it the moment the plaster gives under it. Sometimes the plaster can be removed in large pieces. By-and-by the yellow coating becomes visible. This is the signpost that means "extreme care." The yellow coating usually is removed without difficulty. One must be exceedingly careful, however, not to injure the surface of the new cast. When released, the cast should be inspected and, if injury has been done, it should be corrected. Plaster in a little water, stirred to a creamy consistency, is ideal for repairing when the cast is still damp. It may also be used for painting over any scratches or other disfigurement. When satisfactory, the cast is set away to dry more thoroughly, and will then be ready for a proper finish. See Chapter Thirteen, A Finish for the Plaster Cast.

The Two-Piece Waste Mold

Many models "in the round" have undercut parts and extensions, and, when only one cast of such a model is to be made, the waste mold is a great saving in both time and labor. Some models, if not too complicated, may be cast in a two-piece mold, while others may require molds of several pieces.

As in making a one-piece waste mold, the two-piece waste mold also is built up in two, three, or more layers of plaster with coatings of slip between layers. Also, the first coating is tinted.

In making such a mold, the plaster is thrown or flipped against the surface. It adheres to the model, whether clay or



Fig. 135. Chipping away the one-piece waste mold.

a finished material, and gradually builds up to the desired thickness. Such is the general procedure.

Since this is a two-piece mold, the model must be divided. Proceed as follows:

(1) Consider the best way to divide the model.

(2) Draw this line on the surface. (If the model is plaster, wood, or finished material, make sure that the two sections

can be taken from the mold. See p. 175, A Two-Piece Slip Mold for a Figurine. If the model is clay, this makes little difference, for the clay may be removed in pieces.)

(3) A wall following this line must now be placed about the model. If the model is clay, little pieces of tin, about 1 inch wide and $1\frac{1}{2}$ inches long are set in on the line to about $\frac{1}{8}$ to $\frac{1}{4}$ inch, making a continuous wall about the piece. If the model is a finished piece, such as plaster, wood, etc., a wall of clay about $1\frac{1}{2}$ inches high and $\frac{1}{4}$ inch in thickness is raised on the line. See Fig. 136.

(3) Prepare the tinted plaster for the mold. Apply about $\frac{1}{8}$ inch in thickness. If the model is clay, each side of the wall may be covered. Do not cover the edge of the wall. If the model is a finished piece, make sure the surface is sized before applying the tinted plaster. Apply this to *one side only*.

(4) Apply a thick coating of slip over tinted plaster. This, if the model is clay, covers each side of the wall; if the model is a finished piece, only the one side is coated.

(5) Prepare a larger batch of plaster for coatings at least $\frac{3}{4}$ inch in thickness. Cover each section of the clay model with plaster coating. Cover the half-section of finished model with plaster coating.

(6) Allow this to set for thirty minutes.

Proceed to complete the mold of the clay model as follows:

(7) Remove metal wall. Separate sections by prying apart. Remove clay. If this seems difficult, set the mold with clay in a tub of water for twenty minutes, then remove clay in pieces.

(8) Sponge mold and set aside to dry.

Complete the mold of the finished model:

(9) Remove the clay wall. The mold now shows the plaster wall of the first section. Size the wall thoroughly; also see that the remaining surface of the model is sized. Proceed as in first section—namely:

(a) Coating of tinted plaster.

(b) Layer of slip.



Fig. 136. The two-piece waste mold, showing only one section and the clay wall which separates the two sections. The wall is removed when ready to pour the second section, and the plaster segment is sized so that the two plaster surfaces will not adhere.

- (c) Coating of plaster $\frac{3}{4}$ inch in thickness.
- (d) Let plaster set for thirty minutes, then open mold.
Tapping lightly on seam with a blunt chisel and small

mallet will cause the mold to separate, releasing the model.

(e) Remove model.

(f) Sponge mold and set aside to dry.

After both molds are thoroughly clean and dry, they are ready for the casting process. Since the casting is to be done in plaster or a similar material, each mold is treated in the same manner.

Casting in a Two-Piece Waste Mold

(1) See that the walls have a generous coating of size. After sizing, go over the surface with a coating of sweet oil smoothed on with the finger.

(2) Fit the two sections of the mold together. Tie securely with rope. Seal the seam with plaster.

(3) Set the mold on a level table, open end up and the base horizontal. See that it is well supported. This is very important.

(4) Mix plaster and prepare to fill mold. Since this is a large mold, it will not be filled solid.

(5) Fill the mold about half, tip and turn to see that every part of the surface is covered. Empty the plaster and fill with a fresh mixture.

(6) Watch the plaster as it sets on the walls. When it has gained the correct thickness, from $\frac{3}{4}$ to 1 inch for a mold of this size, the mold is inverted and the remaining plaster emptied.

(7) The mold, with cast, is then set aside for one hour, during which the plaster sets more firmly.

After the plaster has set for one hour, it is not hard, but both mold and cast are in the best condition to be worked upon. Proceed to chip away the mold:

(1) Use a blunt chisel and light mallet. The last coating of plaster will come off easily; in fact, it may break in pieces large and small.

(2) Be on guard when using the chisel. The moment the

plaster gives under it, move it quickly. All tapping should be very light.

(3) When the colored plaster is reached, leave it and take care of the white plaster which has not been removed.

(4) Leave delicate places supported until later.

(5) As one reaches the tinted coating, great care must be taken to avoid injury to the new cast.

Soon, with the last bit of color chipped away, the plaster cast stands released from the mold. If a slight ridge appears on the cast where the plaster has seeped into the seam, remove this with a sharp knife.

Examine the cast for any injury, and correct while the plaster is still damp. The cast, after drying thoroughly, will be ready for an attractive finish, while the mold has, indeed, become waste. See Chapter Thirteen, A Finish for the Plaster Cast.

Chapter Thirteen

A FINISH FOR THE PLASTER CAST

After successfully completing a cast in plaster, the question naturally arises, "How shall I finish the plaster cast?" This is, indeed, an important consideration, for, since the model has passed through the several stages—first designed, then modeled, and next carried through the tedious process of casting—the product should culminate in a beautiful and satisfactory finish to the plaster cast.

The first consideration of importance in preparing the cast for a successful finish is that of the plaster itself. Plaster is porous, and, consequently, absorbent. Therefore it is necessary that the sealing of the porous surface be accomplished before any finish is applied.

A direct way of accomplishing this—at the same time giving the surface a delicate buff or ivory finish—is by the use of linseed oil, as stated in the following directions:

USING LINSEED OIL

In order to thin linseed oil for use, it should be heated over a low fire. The cast, which should be free from dust, should also be warmed. One should never work with oils upon a cold cast. Place the warmed cast near the pan of heated oil and make swift applications from one to the other, working

from the top down. As soon as the first coat has been absorbed, apply the second, working as rapidly as possible. The oil must be kept moving in order to keep it from settling in spots on the surface. If more coats are necessary, keep adding them in the same way. If a tint is desired, a little ochre or raw or burnt sienna may be added to the last coat. After the oil has been absorbed and the model is dry, polish with a worn piece of soft silk or wool. An old silk handkerchief is preferable.

"ANTIQUED" EFFECT

The "antique" effect may be given by adding the pigment suggested above, in varying amounts, depending upon the degree of color desired. Run the color in all the low places in the cast, softening the edges with a dry cloth. Wipe all oil from the high reliefs and the plain areas of the surface.

OIL COLORS

If a cast such as a figurine should call for a number of colors, oil paints are the best. Usually, the cast must first be "conditioned," that is, made nonporous by the application of linseed oil. The surface may then be painted without any further preparation. Oil colors applied in this way impart a softness of texture that is very pleasing. It is possible, however, when the plaster finish is very fine and smooth to paint on this surface without conditioning it. Very fine effects have been achieved by this method.

Successful painting upon plaster depends upon the way it is applied. The paint must be sufficiently thinned with turpentine so it will spread easily over the surface and in no way destroy the delicacy of the modeling. It must leave no brush marks and give no suggestion that the color has been "painted on."

If one prefers to have a pleasing surface finish without color, there are several methods by which this may be accomplished. The following are recommended:

PARAFFIN AND TURPENTINE

Paraffin dissolved in turpentine, 1 ounce to $\frac{1}{2}$ pint, imparts a waxen glow to the white plaster. Turpentine is highly inflammable, however, and great care must be taken. First shave off the paraffin and melt it; then add the turpentine. Have this in a deep pan and warm it over a low flame. Watch it carefully until warmed sufficiently to remove. It should then be brushed on while it and the model are still warm—that is, with the paraffin in liquid-running condition. If the plaster should seem to fill up and clog, hold the cast near a radiator or register until it runs smooth, but never near a flame. When a dull shine appears on the surface, the plaster is filled. The surface is then ready for polishing. A soft silken or woolen cloth is best for this. This finish will impart to the plaster a marblelike glow.

If a cast is small, it may be heated and then immersed in a liquid bath of paraffin and turpentine until it has absorbed all it can take. When dry, polish.

WHITE SHELLAC

(1) Pure white shellac applied in two or three coats gives a very pleasing finish. When combined with alcohol in equal parts and several coats applied, allowing one-half hour between for coatings to dry, it imparts a delicate tint.

(2) If one prefers more color, the above may be followed when dry, by deepening the shadows and emphasizing details with a solution of powdered ochre, raw umber, or sienna with alcohol, put on with a brush. The color must be applied in very light solution, for it is easier to make a light solution darker than to lighten one too dark. Any errors or misplaced color may be easily removed by wiping with a cloth dampened in alcohol.

(3) Another method in applying color to a shellacked surface is as follows: Take a brush filled with color solution and

go all over the model, working from the top down. Follow immediately by wiping off the color from the surface, leaving it, however, in the hollows.

POWDERED SOAPSTONE

Dry, powdered soapstone applied to the unfinished plaster surface and rubbed vigorously with a silken or woolen cloth imparts a soft polish to the surface.

Any one of the foregoing suggestions will produce a pleasing effect and answer with complete satisfaction the question, "How shall I finish the plaster cast?"

GLOSSARY

ARMATURE. A device made of wood or wood combined with wire and piping, upon which clay forms are supported while being modeled.

BATS. Flat slabs of plaster of various size used in building clay pieces, especially pottery.

BISCUIT. Term applied to pottery and other clay forms after being fired once.

BISQUE. Same as BISCUIT.

BODY. The basic material of which a piece is made. Sometimes refers to the main part of a piece.

BONE-DRY. Term applied to clay that is so dry that it powders easily.

CASTING. Making pieces in molds.

CERAMICS. A general term applied to the art of making clay products; also to the products themselves. From the Greek *keramos*, meaning potter's clay, pertaining to pottery.

CHINA. Name for porcelain because it was first made in China.

CRAZING. Appearance of cracks in a finished piece due to the glaze not fitting the body, or over- or under-firing.

ENAMEL. A low-fired glaze.

ENGLOBE. A liquid clay, usually colored, used in decorating clay forms.

FAIENCE. Baked clay that has been covered with a glaze to hide the body of the ware. In Italy, glazed ware first came from Faenza, from which the French derived their knowledge of glazed pottery, and

gave it the name *faience*.

GLOST. A term applied to the firing of glazed ware.

GREEN WARE. Unfired clay forms.

JOGGLE. A notched joint used in making molds.

KILN. A furnace for firing clay products.

LEATHER-DRY. A term used to describe clay forms which have become firm but not fully dry.

LEATHER-HARD. A term used to describe clay forms which have become firm but not bone-dry.

MATT. A term applied to a glaze whose gloss has been dulled.

MAJOLICA. Term applied to earthenware which has been coated with a light, opaque glaze in order that bright colors may be applied in decoration. Term also applies to glaze.

GLOSS. A term applied to a glaze with a bright, shiny surface.

MOLD. A hollow pattern made in plaster or other material in which forms may be cast.

PORCELAIN. Name given to a hard translucent ware. The name is derived from *porcella*, the name of a shell which resembles a little pig. (From Latin *porcus*, a pig.) Porcelain has the delicacy and sheen of this shell.

RETURN. A part of a surface which is at right angles to the main part.

GRAFFITO. A form of decoration in which a dark body is covered with a light slip and the design made by scratching this away, leaving

the dark underbody as the pattern.
SLIP. Clay diluted with water to a creamy consistency. Used for casting, decorating, and as a medium for mending broken green ware.

TEMPLATE. A profile outline or pattern.

TERRA COTTA. Baked clay.

THROWING. Term used in producing clay forms on a potter's wheel.

WEDGING. Method of preparing clay by pounding, slapping, kneading, and cutting to rid the clay of air and secure an even consistency. Used also to indicate firm, compact modeling.

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